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Studies on the Old World species of *Holothrips* (Thysanoptera: Phlaeothripidae)

S. Okajima

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Synopsis

The systematic relationships of the genus *Holothrips* Karny and the tribe Docessissophothripini of the subfamily Phlaeothripinae are considered. One genus, *Panceratothrips*, is recalled from synonymy and transferred from the tribe, and two genera, *Abiastothrips* and *Pseudosymphothrips*, are placed in synonymy. Almost 50 species of *Holothrips* have been described from the New World; this paper includes descriptions of 49 new species and 6 new combinations, and provides a key to 69 Old World species and one Hawaiian species; a further three Old World species remain unclear and are excluded from the key.

The species in the Docessissophothripini are all fungus-feeders, and are usually found on dead leaves and branches.

Introduction

The species of *Holothrips* are medium-sized tubuliferous Thysanoptera belonging to the tribe Docessissophothripini of the subfamily Phlaeothripinae. All the members of this tribe are fungus-feeders and are usually found on dead leaves and branches, but sometimes in grass tussocks or in leaf-litter.

Most of the species in the Phlaeothripinae have slender maxillary stylets (1–3 μm) and, even if they are fungus-feeders, there are no fungal spores in their gut. However, the stylets of the species in the Docessissophothripini are usually moderately broad (4–8 μm) and their gut contents include small spores and even branched hyphae. The only other group of Phlaeothripinae with moderately broad maxillary stylets is the tribe Apelaunothripini (Okajima, 1979; 1984), but that may be distantly related because of the absence of the metathoracic sternopleural sutures.

Because of the broad maxillary stylets, the genera in the tribe Docessissophothripini had been placed in the subfamily Idolothripinae (= Megathripinae) by several authors. Recently, however, Mound & Palmer (1983) transferred them to the Phlaeothripinae, and recognized nine genera in this tribe, redefining each genus with a checklist of included species. According to this work, there were 62 *Holothrips* species in the world, of which 18 were from the Old World and 44 were from the New World. However, in this paper, 54 species are added to the genus from the

Old World. Of this total of 72 Old World species, 13 are known only from single specimens, about 20 from 2–4 specimens, about 15 from 5–9 specimens and the others from more than 10 specimens. Moreover, inadequate material of more than 10 undetermined species from this region has also been examined, indicating that the study of the thysanopterous fauna of the Old World tropics and subtropics is far from complete. Most of the material used in this paper was collected recently from a few localities in South East Asia on a limited number of occasions. Moreover, there are wide areas in the Old World where the thysanopterous fauna is almost unknown, e.g. North and Central Africa, West Asia and New Guinea. This suggests that many more species remain to be found, possibly more than double the number of those included in this study.

The tribe Docessissophothripini seems to be closely related to the genus *Hoplothrips* of the tribe Phlaeothripini (see below), but it is interesting that the species are somewhat different biologically from the species of *Hoplothrips*. In their distribution, the docessissophothripine species are mainly tropical and subtropical, with a few in the temperate zone. However, *Hoplothrips* species occur more in the temperate zone than the tropics, at least in the Old World. For example, eight *Hoplothrips* species have been recorded from England (Mound *et al.*, 1976) although only five have been recorded from India (Ananthakrishnan, 1973). Almost all the species of *Hoplothrips* show extreme allometry, particularly in the males, and the forelegs of the large males are distinctly enlarged. However, most docessissophothripine species do not show this type of size-related variation. Moreover, *Hoplothrips* species often produce large populations under the bark of trees, whereas the docessissophothripine species rarely produce large populations. The present author considers that allometric growth may be related to colony size, because most of the tubuliferous species showing extreme allometry produce large populations or colonies. There is a possibility that allometric growth is not only the result of a difference in nutritive conditions, but also has an ecological or ethological significance. On the other hand, micropterae are very common in *Hoplothrips* species in both sexes and macropterae are sometimes rare, whereas micropterae have been discovered in only four *Holothrips* species in the Old World.

Origin of the Tribe Docessissophothripini

Mound & Palmer (1983: 90) redefined this tribe and transferred it from the Idolothripinae to the Phlaeothripinae, suggesting that it might be related to the tribe Phlaeothripini. The present author largely agrees with this opinion, although tribal relationships within the Phlaeothripinae remain unclear. The nominate tribe Phlaeothripini of the subfamily Phlaeothripinae is used here in a rather different sense from that of Priesner (1961: 290). At least the *Hoplothrips*-complex, placed by Priesner in a separate tribe Hoplothripini, must be included in the Phlaeothripini.

Most of the characters defining the tribe Docessissophothripini are shared with those of the tribe Phlaeothripini. The only distinctive characters of the Docessissophothripini are the moderately broad maxillary stylets and the reticulated areas of the male on the intermediate (usually fourth to seventh) sternites (Figs 4–8). These sternal reticulated areas are somewhat similar to those of the Plectrothripini (Okajima, 1981). However, they are found in both sexes in the Plectrothripini, although only in males in the Docessissophothripini. Moreover, the form of the reticles is more or less different in these two tribes, suggesting that they are independent apomorphies. Recently, sternal reticulated areas have been found in males of *Hoplothrips* (Mound & Walker, 1986). These are quite similar to those of the Docessissophothripini, and it seems possible that they are homologous. In contrast, *Hoplothrips* species usually have a sternal glandular area on the eighth sternite in the male (Fig. 3), as is typical of Phlaeothripini, but the structure of this is distinct from the reticulated areas on the intermediate sternites. If the reticulated areas found on the intermediate sternites of male *Holothrips* and male *Hoplothrips* are really homologous, then there is a possibility that the Docessissophothripini is derived from *Hoplothrips*-like ancestors in the Phlaeothripini. The only apomorphy defining this tribe is thus the relatively broad maxillary stylets.

Of nine genera recognized by Mound & Palmer (1983) in the tribe Docessissophothripini,

four are restricted to the Old World; *Maxillata* and *Pongola* from South Africa, *Asemothrips* from Australia (one species, *pallipes*, from Java) and *Oidanothrips* from the Oriental Region. Three genera, *Docessissophothrips, Symphyothrips* and *Tropothrips*, are restricted to the New World (three *Symphyothrips* species described from the Old World, *aberrans* from India, *alifanensis* from Guam and *longicauda* from Baltic amber, may not be congeneric with the type-species). The remaining genus, *Holothrips* (with its synonym *Abiastothrips*), is widespread in the world. Moreover, this genus is large and includes more than 100 species, whereas the other seven genera are small, each with only a few species that can be distinguished from *Holothrips* only by rather weak characters. From this pattern of speciation, Mound & Palmer (1983) suggested that this tribe evolved relatively recently from the Phlaeothripini.

Characters studied

Head

Head shape is an important character in identifying species or recognising relationships between species. The relative length/width, shape of cheeks, dorsal sculpture and median elevation are useful. Most species have the cheeks weakly and arcuately rounded, but some have almost straight or shallowly emarginate ones. However, shape is sometimes distorted by cover-slip pressure, and delicate care is necessary for study.

Maxillary stylets are usually long, reaching eyes and close together in the middle of head, but sometimes not reaching eyes and more or less apart from each other. They are somewhat broader (4–8 μm) than those of typical Phlaeothripinae (1–3 μm). This condition may be assumed to be apomorphic.

Maxillary guides are simple, but often bowed and distinctly developed. Sometimes they form a weak bridge (Figs 29, 33, 37, 39, 41, 44). Several species from South East Asia having this structure may constitute a natural group (*apoensis*-group, p. 17).

Mouth cone shape is rather clearly divided into two types, rounded (short and obtuse in dorsal aspect) or pointed (long and acute in dorsal aspect); this is an important key character (key couplet 4).

Setae are developed as in typical Phlaeothripini. Most species have a pair of long postocular setae, sharply pointed, expanded, knobbed or blunt at apex, rarely with two pairs in the New World species (undescribed species in BMNH). The ocellar setae are usually short, but a few species have well-developed anteocellar setae (e.g. *subtilis*, Fig. 154) or postocellar setae (Fig. 137). Cheek setae are usually weak.

Antennae are seven-segmented, morphological segments VII and VIII fused, but usually with a suture, complete or incomplete, between them. One New World species, *peruvianus*, has segment VI broadly fused to VII. The relative lengths of the segments are sometimes useful for identification, but are often affected by sex and body size or allometric growth. The sense cone formula on segments III and IV is three and four respectively, but two New World species, *phaeura* and *aberrans*, have only two on III.

Thorax

Pronotum shape may be useful in recognizing relationships between species, but it is often affected by sex and body size. The relative length/ head length or / width, shape of anterior margin and the sculpture of the surface are considered in this study.

Epimeral sutures are present posterolaterally on the pronotum, and usually complete.

Setae on the pronotum are situated regularly. Five major setae are present, but the anteromarginal pair is sometimes reduced. The setal apices are variable in shape.

Wings are usually present, micropterae being known in only four species in the Old World. Forewings, if well developed, have a series of duplicated cilia on the distal hind margin, but these exhibit a range of both intraspecific and interspecific variation.

Forelegs have a tarsal tooth in both sexes. The shape is variable, small or large, curved or straight, wide-based or not, and sometimes is affected by sex and body size. The foretibiae rarely have a subapical tubercle at the inner apex, and the forefemora also rarely have a median

tubercle (Fig. 187) or hump, which may be related to both allometric growth and sex. For example, the large males of *cracens* have a forefemoral median hump, but this is absent in the female and the small male (Ananthakrishnan, 1973). The enlargement and elongation of the forelegs in males related to allometric growth is usually less distinct than in *Hoplothrips* species.

Abdomen

Pelta (= first abdominal tergite) is usually bell-shaped or rather triangular, often hat-shaped, and a little broader than long. The shape and pattern of the sculpture is fairly stable within species and is sometimes useful in identification. A pair of the micro-pores is present or absent near the posterior margin of the pelta, and this is an important key character (key couplet 49).

Tergites II to VII each bear two pairs of sigmoid wing retaining setae in macropterae, but sometimes the posterior pair on VII is reduced to being short and straight. Tergites II to IX each bear two pairs of major setae (B1 and B2) situated near the lateral angles, but those on tergite IX are situated medially (B1) and submedially (B2). The outside pair (B2) on tergite II is usually short and pointed at apex, but the others are well developed and their apices are variable in shape, sharply pointed, blunt, knobbed or expanded. The combination of shapes of these setae is often useful in defining species. In a group of several species from the New World, e.g. *ingens* (type species of the genus), these setae are flattened and remarkably wide, but this may be affected by sex because males of these species have these setae more slender.

Tube shape is variable and important in defining species. It is usually straight-sided, but often weakly constricted near the base or apex, or somewhat heavy in several species. However, in most cases, this character does not seem to indicate relationships between species, thus suggesting homoplasy. The relative lengths of the tube and head are sometimes important in recognising relationships. Members of the *apoensis*-group (see p. 17), apparently a natural group from the Old World, have the tube longer than the head, whereas most other species have a shorter tube. The surface is usually smooth, but is sometimes sculptured with polygonal reticulation or longitudinal wrinkles.

Sternal reticulated areas (Figs 4–8) are present or absent on the intermediate sternites (usually IV–VII) of the male, usually transversely developed, but sometimes reduced and divided into two parts. They are present in up to 60 per cent of those Old World species in which males are known. However, they are affected by body size or allometric growth.

Measurements

The relative length of head and tube are quite important for the identification of the *Holothrips* species. In this paper, the following standards were used. (In all cases care was taken not to measure specimens distorted by cover-slip pressure.)

Length of head: from anterior margin of eyes to base at middle on dorsal surface (Fig. 1a).

Width of head: maximum width across cheeks (Fig. 1b).

Length of tube: from anterior margin to posterior margin of abdominal segment X on dorsal surface at middle (Fig. 2a).

Basal width of tube: maximum width near base, excluding basal collar (Fig. 2b).

Abbreviations

The following abbreviations are used in the descriptions and the key.

A*n*: antennal segment *n*. MA*n*: morphological antennal segment *n*. POS: postocular setae. AA: anteroangular setae on prothorax. AM: anteromarginal setae on prothorax. ML: midlateral setae on prothorax. PA: posteroangular setae on prothorax. EPIM: epimeral setae on prothorax. DC: duplicated cilia on forewings. SWS: subbasal wing setae on forewings (SWS*n*, numbered from basal one). WRS: wing retaining setae on abdominal tergites. S*n*: abdominal sternite *n*. T*n*: abdominal tergite *n*. B1: inside pair of major setae at or near posterior margin on tergite. B2: outside pair of major setae at or near posterior margin on tergite. [B1(T*n*): inside pair on tergite *n*.] L: length. W: width.

The following abbreviations are used for the depositories.

BMNH: British Museum (Natural History), London. CAS: California Academy of Sciences, San

Francisco. SMF: Senckenberg Museum, Frankfurt. SO: S. Okajima collection, Tokyo University of Agriculture, Tokyo. TNA: Prof. T. N. Ananthakrishnan collection, Loyola College, Madras.

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Nomenclatural summary

Taxa transferred from *Holothrips*

PANCERATOTHRIPS Bagnall, 1936 **gen. rev.**
typicus Bagnall, 1936

***Holothrips* from the Old World**

HOLOTHRIPS Karny, 1911
Trichothrips (Abiastothrips) Priesner, 1925 **syn. n.**
Lathrobiothrips Karny, 1933
Adelothrips Hood, 1938
Cordylothrips Hood, 1937
Ischnothrips Moulton, 1944
Agnostothrips Moulton, 1947
Pseudosymphothrips Kurosawa, 1954 **syn. n.**
Agnostothrips (Erythrinothrips) Ananthakrishnan, 1956
Stinothrips Ananthakrishnan, 1969
Holmiella zur Strassen, 1972
***africanus* sp. n.**
***ananthakrishnani* sp. n.**
andamanensis (Sen, 1980) **comb. n.**
***andrei* sp. n.**
angulatus (Priesner, 1927) **comb. n.**
***angulus* sp. n.**
***antennalis* sp. n.**
***apoensis* sp. n.**
***armatus* sp. n.**
***attenuatus* sp. n.**
australis (Mound, 1974)
***breviceps* sp. n.**
***brevicollis* sp. n.**
***brevitubus* sp. n.**
***castanicolor* sp. n.**
caudatus (Bagnall, 1915)
***celebensis* sp. n.**
***cephalicus* sp. n.**
citricornis (Bagnall, 1913)
cracens (Ananthakrishnan, 1968)

***cupreus* sp. n.**
***curvidens* sp. n.**
***falcatus* sp. n.**
***flavicornis* sp. n.**
***flavitubus* sp. n.**
***flavus* sp. n.**
***formosanus* sp. n.**
fumidus (Ananthakrishnan, 1972)
***hagai* sp. n.**
***hasegawai* sp. n.**
indicus (Ananthakrishnan, 1956)
associatus Ananthakrishnan, 1968
***japonicus* sp. n.**
kuntiae (Sen, 1982) **comb. n.**
***latidentis* sp. n.**
luteus (Faure, 1954)
***luminosus* sp. n.**
***maxillae* sp. n.**
mirandus (Ananthakrishnan, 1969)
***moundi* sp. n.**
nepalensis (Pelikan, 1970)
***nigripes* sp. n.**
nigritus (zur Strassen, 1972)
***oceanicus* sp. n.**
***ogasawarensis* sp. n.**
***okinawanus* sp. n.**
***parallelus* sp. n.**
***peltatus* sp. n.**
***peninsulae* sp. n.**
***pictus* sp. n.**
***porifer* sp. n.**
***pulchellus* sp. n.**
***quadrisetis* sp. n.**
ruidus (Ananthakrishnan, 1969)
***ryukyuensis* sp. n.**
***sakimurai* sp. n.**
***sawadai* sp. n.**
schaubergeri (Priesner, 1920) **comb. n.**
priesneri Bagnall, 1933
lativerticis Post, 1961
semiflavus (Moulton, 1947)
***setosus* sp. n.**
soror (zur Strassen, 1974) **comb. n.**
speciossissimus (Karny, 1920)
stannardi (Ananthakrishnan, 1972)
***storki* sp. n.**
subtilis (Ananthakrishnan, 1972)
***tibialis* sp. n.**
titschacki (Priesner, 1928)
f. *debilis* Priesner, 1928
***torajanus* sp. n.**
***torosus* sp. n.**
typicus (Ananthakrishnan, 1967)
***unicolor* sp. n.**
yuasai (Kurosawa, 1954) **comb. n.**
***yurikoae* sp. n.**
zimmermanni (Moulton, 1944)

Genus recalled from synonymy with *Holothrips*

PANCERATOTHRIPS Bagnall **gen. rev.**

Panceratothrips Bagnall, 1936: 219–220. Type-species: *Panceratothrips typicus* Bagnall, by monotypy. [Synonymized with *Polyphemothrips* Schmutz by Mound, 1968: 146, and with *Holothrips* Karny by Mound & Palmer, 1983: 92.]

Mound (1968: 146) and Mound & Palmer (1983: 92) synonymized this genus with *Polyphemothrips* and *Holothrips* respectively. However, the long maxillary stylets of *typicus*, type-species of the genus, are narrower than those of docessissophothripine species, and do not differ from those of typical Phlaeothripini. Since the tribe Docessissophothripini is here distinguished from the tribe Phlaeothripini only by the moderately broad maxillary stylets, *Panceratothrips* is placed in the tribe Phlaeothripini.

Panceratothrips typicus Bagnall

Panceratothrips typicus Bagnall, 1936: 220. Lectotype ♀, MADAGASCAR (Muséum National d'Histoire Naturelle, Paris) [1 ♀ paralectotype examined].
Polyphemothrips typicus (Bagnall) Mound, 1968: 146.
Holothrips typicus (Bagnall) Mound & Palmer, 1983: 95.

The seventh and eighth antennal segments of this species are fused completely as in the Docessissophothripini, but this feature is also found in many other phlaeothripine genera.

MATERIAL EXAMINED
Madagascar: 1 ♀ (paralectotype), Province of Tanarive, 1905 (*A. Mathiaux*) (BMNH).

Taxonomy of the genus *Holothrips* from the Old World

HOLOTHRIPS Karny

Holothrips Karny, 1911: 502; Mound & Palmer, 1983: 92–95. Type-species: *Holothrips ingens* Karny, by monotypy.
Trichothrips (Abiastothrips) Priesner, 1925: 153. Type-species: *Trichothrips schaubergeri* Priesner, by original designation. [Raised to genus by Priesner, 1927: 556.] **Syn. n.**
Cratothrips Priesner, 1927: 494–495. Type-species: *Cratothrips angulatus* Priesner, by monotypy. [Synonymized with *Abiastothrips* Priesner by zur Strassen, 1974: 119–120.]
Lathrobiothrips Hood, 1933: 421. Type-species: *Lathrobiothrips ramuli* Hood, by monotypy. [Synonymized by Mound & Palmer, 1983: 92.]
Cordylothrips Hood, 1937: 517–518. Type-species: *Cordylothrips peruvianus* Hood, by monotypy. [Synonymized by Mound & Palmer, 1983: 93.]
Adelothrips Hood, 1938: 380. Type-species: *Adelothrips xanthopus* Hood, by monotypy. [Synonymized by Mound & Palmer, 1983: 93.]
Ischnothrips Moulton, 1944: 305. Type-species: *Ischnothrips zimmermanni* Moulton, by monotypy. [Synonymized by Mound & Palmer, 1983: 93.]
Agnostothrips Moulton, 1947: 172–173. Type-species: *Agnostothrips semiflavus* Moulton, by monotypy. [Synonymized by Mound & Palmer, 1983: 93.]
Pseudosymphothrips Kurosawa, 1954: 134. Type-species: *Pseudosymphothrips yuasai* Kurosawa, by monotypy. **Syn. n.**
Agnostothrips (Erythrinothrips) Ananthakrishnan, 1956: 341. Type-species: *Agnostothrips (Erythrinothrips) indicus* Ananthakrishnan, by monotypy. [Raised to genus by Ananthakrishnan, 1964: 94; synonymized by Mound & Palmer, 1983: 93.]
Stinothrips Ananthakrishnan, 1969: 55. Type-species: *Ischnothrips typicus* Ananthakrishnan, by monotypy. [Synonymized by Mound & Palmer, 1983: 93.]
Holmiella zur Strassen, 1972: 95–98. Type-species: *Holmiella nigrita* zur Strassen, by monotypy. [Synonymized by Mound & Palmer, 1983: 93.]

DIAGNOSIS. Colour yellow to dark brown, usually with red hypodermal pigments. Head usually longer than broad, sometimes elevated dorsally, dorsal surface partly or generally sculptured. Antennae 7-segmented; MA7 and MA8 completely fused, but usually with a complete, incomplete or reduced suture between them; A3 with three sense-cones, A4 with four sense-cones. Mouth-cone variable in shape, short or long, rounded or pointed; maxillary stylets more or less broad like those of idolothripine species, long, usually reaching eyes, usually parallel and touching together in the middle of head, but sometimes not reaching

eyes and more or less apart from each other; maxillary bridge usually absent, sometimes present but weak and narrow. Praepectus absent. Epimeral suture usually complete. Foretarsi each with a tooth in both sexes. Metathoracic sternopleural sutures present. Metanotal median pair of setae usually weak. Forewings not constricted medially; with DC. Pelta bell-shaped or rather triangular, a pair of micro-pores present or absent. S4 to S7 of male usually with transverse reticulated areas. Tube usually shorter than head, sometimes longer, variable in shape.

COMMENTS. Nine genera were synonymized with this genus by Mound & Palmer (1983: 92–93). The present author has re-examined most of these synonymized genera, and agrees with this treatment of them, except for the genus *Panceratothrips* Bagnall (see above).

Abiastothrips was erected originally as a subgenus of *Trichothrips* for a species, *schaubergeri*, with the head almost as long as broad, and with the inter-antennal projection exceptionally broad. However, one of the subsequent members, *soror*, has a more slender head which is intermediate between *schaubergeri* and *Holothrips* species. Moreover, one Australian species of *Holothrips*, *australis*, has a somewhat broad inter-antennal projection. *Pseudosymphothrips* was also erected for a single species, *yuasai*, and cannot be distinguished satisfactorily from *Holothrips* by the general appearance.

The genus *Holothrips* includes a wide range of shapes of the head, maxillary stylets and tube. The head is usually short and weakly or not elevated medially, but sometimes elongate and strongly elevated. The maxillary stylets are usually curved simply or rather straight in the mouth-cone, but sometimes looped or angulate laterally. Moreover, the range appears as a morpho-cline, more or less continuous and cannot be divided into subgroups. The genus *Docessissophothrips*, which is most clearly related to *Holothrips*, has been distinguished by the head long and strongly elevated medially and the maxillary stylets looped or angulate laterally. These features appear to be shared with some *Holothrips* species and are insufficient to distinguish the two genera, and *Holothrips* could therefore well be treated as a synonym of *Docessissophothrips*. Unfortunately the unique holotype male of *ampliceps*, the type-species of *Docessissophothrips*, is in a more or less poor condition, having been remounted into balsam from dry material on a card, therefore the present author cannot compare these two genera closely.

Key to the Old World species

Three species, *angulatus*, *stannardi* and *titschacki*, have not been studied by the present author and are excluded from this key. One Hawaiian species, *sakimurai*, newly described below is included with the Old World species. The type-locality, not the full distribution, is given in parentheses.

1 Tube shorter than 2·0 times as long as basal width; dorsal surface of head generally covered with transverse rows of weak and fine striation or reticulation (Figs 9, 11, 13) 2
– Tube longer than 2·1 times as long as basal width, if shorter than 2·0 times, dorsal surface of head with distinct polygonal reticulation 4
2 Head much longer than 1·5 times as long as broad; ocellar region distinctly convex (Fig. 9); all tibiae dark brown (Brunei) ..... ***brevicollis*** sp. n. (p. 19)
– Head shorter than 1·5 times as long as broad; ocellar region not distinctly convexed; mid and hindtibiae largely yellow 3
3 Maxillary stylets angulate in mouth-cone (Fig. 11); well-sclerotized robust species (Sulawesi) ***parallelus*** sp. n. (p. 39)
– Maxillary stylets not angulate in mouth-cone (Fig. 13); weakly sclerotized feeble species (Philippines: Luzon) ..... ***brevitubus*** sp. n. (p. 20)
4 Mouth-cone short and rounded, at least not sharply pointed 5
– Mouth-cone long and pointed 43
5 Mid-vertex (mid-dorsal) head setae, also B1 and B2 setae on T9 expanded at apex (South Africa) ..... ***luteus*** (Faure) (p. 32) [*cf.* ***titschacki*** (Priesner) (p. 50)]
– Mid-vertex head setae and B2 setae on T9 sharply pointed at apex, B1 on T9 variable in shape, pointed, blunt, expanded or knobbed 6
6 Head much longer than 1·5 times as long as broad 7
– Head shorter than 1·5 times as long as broad 9
7 Metathorax and apical fourth of tube yellow, the rest of body brown to dark brown; maxillary stylets angulate or looped laterally in mouth-cone (Fiji) ..... ***zimmermanni*** (Moulton) (p. 54)
– Body uniformly dark brown; maxillary stylets smoothly curved or rather straight, not strongly angulate 8
8 Hindtibiae yellow; head 1·5–1·7 times as long as broad (Fig. 20) (India) ***mirandus*** (Ananthakrishnan) (p. 34)
– All tibiae dark brown; head 1·75–1·80 times as long as broad (Fig. 17) (Java) ***nigripes*** sp. n. (p. 36)

9 Tube almost as long as head or longer 10
– Tube much shorter than head 17
10 Maxillary stylets almost touching together at median portion of head, without maxillary bridge, reaching posterior margins of eyes 11
– Maxillary stylets more or less apart from each other, with weakly developed maxillary bridge, not reaching posterior margins of eyes (Figs 29, 33, 37, 39, 41, 44) 12
11 Tube almost as long as head, with some longitudinal wrinkles (Fig. 23); A7 almost as long as A6 or a little shorter; cheeks almost straight, subparallel (Fig. 22) (Brunei)..... ***storki*** sp. n. (p. 49)
– Tube slightly longer than head (Fig. 27); A7 longer than A6; head broadest across cheeks at posterior third (Fig. 26)..... ***torajanus*** sp. n. (p. 51)
12 Body largely yellow; antennae longer than 2·5 times as long as head; A3 longer than 3·0 times as long as broad (Fig. 40) (Philippines: Luzon) ..... ***flavus*** sp. n. (p. 27)
– Body brown to dark brown; antennae shorter than above 13
13 Maxillary stylets not reaching level of POS (Fig. 44) (Philippines: Mindanao) ***maxillae*** sp. n. (p. 33)
– Maxillary stylets reaching level of POS 14
14 POS expanded at apex (Fig. 41) (Brunei) ..... ***armatus*** sp. n. (p. 17)
– POS pointed or blunt at apex, at least not strongly expanded..... 15
15 A4 to A6 bicolorous, brown with yellowish bases; B2(T9) shorter than 0·6 times as long as tube; tube 3·00–3·15 times as long as basal width (Fig. 34) (Philippines: Mindanao) ***apoensis*** sp. n. (p. 16)
– A4 to A6 uniformly brown; B2(T9) longer than 0·7 times as long as tube; tube 2·5–2·7 times as long as basal width (Fig. 30) 16
16 Head 1·1 times as long as broad; POS blunt or very weakly expanded at apex (West Malaysia) (Fig. 29)..... ***peninsulae*** sp. n. (p. 40)
– Head almost as long as broad; POS sharply pointed at apex (Sarawak) .. ***caudatus*** (Bagnall) (p. 21)
17 Cheeks strongly serrate, or with some strong warts; head usually not strongly elevated; pronotum well developed, at least with a strong median line and polygonal reticulation (Fig. 68)..... 18
– Cheeks usually not strongly serrate, if with strong warts, at least shallowly emarginate; head usually elevated dorsally; pronotum comparatively small, without strong reticulation, median line usually weak..... 27
18 Uniformly brown to dark brown..... 19
– Bicolorous brown and yellow, or largely yellow 24
19 Mid-vertex (mid-dorsal) head setae well developed, 100–150 μm; A7 with a complete suture between MA7 and MA8; prothoracic AA minute, much shorter than AM; pelta with a pair of micro-pores (Kenya) ..... ***nigritus*** (zur Strassen) (p. 37)
– Mid-vertex head setae minute, shorter than 50 μm; suture between MA7 and MA8 incomplete or reduced; prothoracic AA well developed, as long as AM or longer; pelta without micro-pores 20
20 POS sharply pointed at apex 21
– POS blunt, knobbed or expanded at apex 22
21 Head 1·20–1·25 times as long as broad (Fig. 62) (Japan: Ryukyus) ..... ***ryukyuensis*** sp. n. (p. 44)
– Head about 1·4 times as long as broad (Fig. 65) (West Malaysia) ..... ***unicolor*** sp. n. (p. 52)
22 Maxillary stylets not reaching level of POS (Fig. 69); interior margin of foretibia with some strong warts; eyes circular (Singapore) ..... ***torosus*** sp. n. (p. 51)
– Maxillary stylets longer, reaching eyes; interior margin of foretibia smooth 23
23 Cheeks with some strong warts; foretibiae each with an apical tubercle (New Guinea) ***semiflavus*** (Moulton) (p. 47)
– Cheeks without strong warts, only serrate (Fig. 58); foretibia without apical tubercle (Brunei) ***curvidens*** sp. n. (p. 24)
24 Tube largely brown, with paler base; A3 longer than 2·6 times as long as broad (India) ***kuntiae*** (Sen) (p. 31)
– Tube largely yellow, with somewhat darker apex; A3 shorter than 2·2 times as long as broad..... 25
25 Foretibiae each with a subapical tubercle (Fig. 56); B1(T9) blunt or very weakly expanded at apex (Sulawesi) ..... ***tibialis*** sp. n. (p. 50)
– Foretibiae without distinct subapical tubercles; B1(T9) sharply or nearly pointed at apex..... 26
26 Head and mesonotum brown, concolorous with pronotum; A7 almost as long as A6, without suture between MA7 and MA8 (Fig. 49); tube weakly constricted at basal third (Fig. 48) (India)..... ***ruidus*** (Ananthakrishnan) (p. 44)

– Head and mesonotum yellow to brownish yellow, much paler than brown pronotum; A7 much longer than A6, with a complete suture between MA7 and MA8 (Fig. 52); tube almost straight-sided (Fig. 51) (Ghana) ..... ***africanus*** sp. n. (p. 12)
27 Body largely yellow, at least prothorax yellow 28
– Body largely brown to dark brown, at least prothorax brown 31
28 Body bicolorous yellow and brown, anterior portion of head, lateral portions of pterothorax brownish; all femora shaded with brown apically (India) ..... ***cracens*** (Ananthakrishnan) (p. 23)
– Body almost uniformly yellow 29
29 Head shorter than 1·25 times as long as broad (Fig. 72); epimeral suture incomplete (Japan) ***yurikoae*** sp. n. (p. 53)
– Head longer than 1·35 times as long as broad; epimeral suture complete 30
30 Cheeks shallowly emarginate (Fig. 117), with some warts; A3 about twice as long as broad (Philippines: Luzon) ..... ***luminosus*** sp. n. (p. 33)
– Cheeks almost straight or weakly swollen, without any warts; A3 about 3·0 times as long as broad (India) ..... ***typicus*** (Ananthakrishnan) (p. 52)
31 Mid and hindtibiae yellow 32
– Mid and hindtibiae brown to dark brown, sometimes paler apically 38
32 Suture between MA7 and MA8 complete 33
– Suture between MA7 and MA8 incomplete or reduced 35
33 Cheeks shallowly emarginate (Fig. 85); POS sharply pointed at apex; A7 slender, about 5·0 times as long as broad, much longer than A3 (Fig. 86) (Singapore) ..... ***antennalis*** sp. n. (p. 15)
– Cheeks weakly swollen or straight, at least not emarginate; POS expanded or knobbed at apex; A7 less than 4·0 times as long as broad 34
34 Head longer than 1·3 times as long as broad; A1 to A5 yellow; POS almost as long as eye; prothoracic AM minute (Tanzania) ..... ***citricornis*** (Bagnall) (p. 23)
– Head shorter than 1·2 times as long as broad (Fig. 75); at least A4 and A5 brown; POS much longer than eye; prothoracic AM well developed, expanded at apex (Hawaii) ***sakimurai*** sp. n. (p. 45)
35 Epimeral suture incomplete 36
– Epimeral suture complete 37
36 Sculpture on head with many fine tubercles or warts (Fig. 89); cheeks weakly emarginate; B1(T9) longer than tube; hind coxae yellowish, much paler than femora; B2(T3–T7) sharply pointed (Brunei) ..... ***cephalicus*** sp. n. (p. 22)
– Sculpture on head normal; cheeks angulate just behind eyes, then distinctly emarginate (Fig. 121); B1(T9) shorter than tube; hindcoxae brownish, almost concolorous with femora; B2(T3–T5) very weakly expanded, B2 (T6 and T7) sharply pointed (Singapore) ***angulus*** sp. n. (p. 15)
37 Head distinctly narrowed towards base (Fig. 119), tinged with yellow at anterior half; pronotum shorter than 0·4 times as long as head; metanotum with at least 6 pairs of prominent setae (Fig. 111); B1(T9) almost as long as tube (Philippines: Mindanao) ***setosus*** sp. n. (p. 47)
– Head almost parallel-sided (Fig. 92), uniformly brown; pronotum almost half the length of head; metanotum with 4 pairs of prominent setae; B1(T9) much shorter than tube (Australia) ..... ***oceanicus*** sp. n. (p. 37)
38 POS expanded at apex 39
– POS blunt or nearly pointed at apex, at least not expanded 40
39 Antennae short, shorter than 1·5 times as long as head; cheeks shallowly emarginate; tube almost half the length of head, weakly constricted at basal third and near apex; tibiae generally dark brown (Australia) ..... ***australis*** (Mound) (p. 18)
– Antennae about 2·0 times as long as head; cheeks almost straight (Fig. 78); tube 0·75 times as long as head, almost straight-sided (Fig. 79); tibiae dark brown, but gradually paler apically (West Malaysia) ..... ***andrei*** sp. n. (p. 14)
40 A3 and A4 yellow in basal halves, brown in apical halves (Japan: Ogasawara) ***ogasawarensis*** sp. n. (p. 37)
– A3 and A4 generally brown to dark brown 41
41 A7 about 3·5 times as long as broad (Fig. 106); inner side of probasisternum rather pointed (Fig. 105); pelta darkened medially (Japan) ..... ***japonicus*** sp. n. (p. 31)
– A7 shorter than 3·0 times as long as broad; inner side of probasisternum usually rounded (Fig. 108); pelta usually pale 42

42 A7 2·7–3·0 times as long as broad (Fig. 97); prothoracic AA, SWS and most of B1 and B2 setae on tergites blunt at apex (Japan) ..... ***latidentis*** sp. n. (p. 32)
– A7 shorter than 2·6 times as long as broad (Fig. 97); prothoracic AA, SWS and most of B1 and B2 setae on tergites pointed at apex (Japan: Ryukyus) ..... ***okinawanus*** sp. n. (p. 38)
43 Body bicolorous yellow and brown, at least posterior portion of head yellowish, paler than prothorax, sometimes fully yellow 44
– Body uniformly brown to dark brown 49
44 B1(T9) weakly expanded or knobbed at apex; pelta without micro-pores (Australia) ***speciossissimus*** (Karny) (p. 48)
– B1(T9) sharply pointed at apex; pelta with a pair of micro-pores 45
45 A3 and A4 brown, darker than A1 and A2; B2(T6) sharply pointed at apex (West Malaysia) ***pulchellus*** sp. n. (p. 43)
– At least basal thirds of A3 and A4 yellowish, concolorous with A1 and A2; B2(T6) expanded or knobbed at apex 46
46 A3 and A4 largely yellow 47
– Basal half of A3 and basal third of A4 yellowish, the rest brown 48
47 Tube distinctly constricted at basal third and apex (Fig. 136); suture between MA7 and MA8 reduced (Andaman) ..... ***andamanensis*** (Sen) (p. 14)
– Tube almost straight-sided; suture between MA7 and MA8 nearly complete (India) ..... ***indicus*** (Ananthakrishnan) (p. 30)
48 Tube heavy, 0·79–0·82 times as long as head, dorsal surface with distinct polygonal reticulation (Fig. 134) (Singapore) ..... ***sawadai*** sp. n. (p. 46)
– Tube slender, almost straight-sided, 0·73–0·75 times as long as head, dorsal surface smooth (Fig. 131) (Philippines: Luzon) ..... ***pictus*** sp. n. (p. 41)
49 Pelta with a pair of micro-pores 50
– Pelta without micro-pores 64
50 Mid and hindtibiae brown to dark brown, sometimes with yellowish bases and apices 51
– Mid and hindtibiae yellow 56
51 Tube slender, longer than 0·75 times as long as head 52
– Tube shorter than 0·7 times as long as head 54
52 Ocellar region not convex; dorsal surface of head weakly sculptured (Fig. 151) (West Malaysia) ***peltatus*** sp. n. (p. 40)
– Ocellar region more or less convex; dorsal surface of head distinctly sculptured with polygonal reticulation 53
53 Head 1·4–1·5 times as long as broad (Fig. 137); postocellar setae well developed, longer than half the length of POS (India) ..... ***quadrisetis*** sp. n. (p. 43)
– Head 1·2–1·3 times as long as broad (Fig. 141); postocellar setae minute (Nepal) ***nepalensis*** (Pelikan) (p. 35)
54 Interocellar setae well developed, almost as long as eye (Fig. 154); tube weakly constricted at basal third and apex (Fig. 155) (India) ..... ***subtilis*** (Ananthakrishnan) (p. 49)
– Interocellar setae minute; tube almost straight-sided 55
55 Head longer than 1·1 times as long as broad (Fig. 144); POS usually pointed at apex; inter-antennal projection not so broad (Madeira) ..... ***soror*** (zur Strassen) (p. 48)
– Head almost as long as broad, or a little broader (Fig. 146); POS knobbed or weakly expanded at apex; inter-antennal projection broad (Austria) ..... ***schaubergeri*** (Priesner) (p. 46)
56 Basal two-thirds of tube yellow; foretibiae dark brown (Java) ..... ***flavitubus*** sp. n. (p. 26)
– Tube brown to dark brown; foretibiae usually yellowish, at least paler than forefemora 57
57 B2(T6) short, expanded or blunt at apex 58
– B2(T6) long, sharply pointed at apex 60
58 Cheeks subparallel (Fig. 157); A5 largely yellow, shaded with brown apically (Singapore) ***flavicornis*** sp. n. (p. 25)
– Cheeks gradually narrowed towards base; A5 brown 59
59 B1(T9) blunt at apex, at least not sharply pointed; tube longer than 3·2 times as long as basal width (Fig. 175) (Sulawesi) ..... ***falcatus*** sp. n. (p. 25)
– B1(T9) sharply pointed at apex; tube about 3·0 times as long as basal width, or a little shorter (Fig. 179) (West Malaysia) ..... ***moundi*** sp. n. (p. 35)
60 Suture between MA7 and MA8 complete or nearly complete 61
– Suture between MA7 and MA8 reduced 62

61 Head about 1·2 times as long as broad (Fig. 160); dorsal surface of tube weakly sculptured near base; body usually chestnut-brown; A4 brown, with yellow base (Taiwan, Japan: Ryukyus) ***porifer*** sp. n. (p. 42)
– Head about 1·1 times as long as broad; dorsal surface of tube smooth; body usually dark brown; A4 yellowish, with apex shaded (India) ..... ***ananthakrishnani*** sp. n. (p. 13)
62 Head almost as long as broad (Fig. 166) (West Malaysia) ..... ***breviceps*** sp. n. (p. 18)
– Head longer than 1·1 times as long as broad 63
63 Foretibiae yellow (Philippines: Mindanao) ..... ***cupreus*** sp. n. (p. 23)
– Foretibiae brown (West Malaysia) ..... ***castanicolor*** sp. n. (p. 20)
64 Head longer than 1·4 times as long as broad (Fig. 181); cheeks almost straight, subparallel (Sulawesi) ..... ***celebensis*** sp. n. (p. 21)
– Head shorter than 1·3 times as long as broad; cheeks more or less rounded 65
65 POS expanded at apex ..... *cf.* ***speciossissimus*** (Karny) (p. 48)
– POS pointed or blunt at apex, at least not expanded 67
66 Tube longer than 0·9 times as long as head 67
– Tube shorter than 0·85 times as long as head 68
67 Dorsal surface of head sculptured weakly (Fig. 151); POS nearly pointed, but blunt; tube almost as long as head, dorsal surface with weak sculpture (Fig. 152) ..... *cf.* ***peltatus*** sp. n. (p. 40)
– Dorsal surface of head with distinct polygonal reticulation (Fig. 184); POS sharply pointed; tube about 0·9 times as long as head, dorsal surface almost smooth (Taiwan) (Fig. 185) ***formosanus*** sp. n. (p. 27)
68 Head about 1·2 times as long as broad 69
– Head shorter than 1·1 times as long as broad 70
69 A4 to A6 generally brown to dark brown; cheeks weakly rounded (Fig. 202) (India) ***fumidus*** (Ananthakrishnan) (p. 28)
– A4 to A6 each with yellowish base; cheeks rather straight and gradually narrowed towards base (Fig. 205) (Japan: Ogasawara) ..... ***hasegawai*** sp. n. (p. 30)
70 A4 to A6 each with yellowish base (Japan) ..... ***yuasai*** (Kurosawa) (p. 53)
– A4 to A6 generally brown to dark brown 71
71 Tube almost straight-sided, at least not constricted at basal third, dorsal surface almost smooth (Fig. 191); B1(T9) shorter than 0·8 times as long as tube (Taiwan) ..... ***attenuatus*** sp. n. (p. 17)
– Tube distinctly constricted at basal third and apex, surface with distinct polygonal reticulation (Fig. 193); B1(T9) longer than 0·9 times as long as tube (Japan) ..... ***hagai*** sp. n. (p. 29)

Descriptions of species

Holothrips africanus sp. n.

(Figs 50–52)

Female (macroptera). Bicolorous yellow and brown; head brownish yellow; prothorax yellowish brown, distinctly darker than head; pterothorax yellow, mesothorax shaded with pale yellowish brown; abdomen yellow to pale brown, gradually darkened towards posterior portion; tube yellow, with apex somewhat darker; forefemora yellow, mid and hindfemora yellow, shaded with pale brown medially; all tibiae yellow; A1 to A3 yellow, a little paler than head, A4 pale brownish yellow, A5 pale brown with yellowish base, A6 and A7 brown to dark brown; wings shaded with pale brown; major setae yellowish.

Head (Fig. 50) 1·28 times as long as broad, dorsal surface sculptured postero-laterally, not strongly elevated; cheeks corrugated, gradually narrowed towards base, almost straight-sided; POS as long as or a little longer than one-third the length of head, expanded at apex. Eyes rounded, 0·26–0·27 times as long as head. Antennae (Fig. 52) 1·85–1·89 times as long as head, A7 longer than A3, the longest; A7 with a complete suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum about 1·4 times as broad as long, with strong median line, almost smooth; major setae expanded at apex. Forewings each with 7–9 DC; SWS expanded at apex. Pelta bell-shaped, but weakly developed, micro-pores absent. B1(T2–T8) and B2(T3–T6 and T8) expanded at apex, B1(T9) and B2(T7 and T9) sharply pointed at apex. Tube (Fig. 51) almost straight-sided, gradually narrowed towards apex, about 0·6 times as long as head, about 2·0 times as long as basal width, surface smooth. Anal setae almost as long as tube or a little longer.

Measurements of holotype female in μm. Total L about 3000 (distended). Head L 327, W 255; eye L 87. Pronotum L 230, W 321; forewing L 1080. Tube L 194, basal W 96, apical W 46. A1 to A7 L(W): 77(58); 71(40); 97(48); 92(47); 82(41); 76(38); 108(30).

Length of setae: POS 112–117. Prothoracic AA 53–58, AM 57–58, ML 75–85, PA 86–87, EPIM 72–76. SWS1 about 50, SWS2 56, SWS3 66–68. B1(T9) 225–230, B2(T9) 210–217. Anals 198–210.

MALE. Unknown.

Holotype ♀ (mac.), **Ghana**: *Tapinanthus banguensis* on cocoa, 1970 (*M. P. Room*) (BMNH).
Paratypes. **Ghana**: 2 ♀, same data as holotype (BMNH).

COMMENTS. In the corrugated head and the rounded eyes, this species may be related to *ruidus* from India. However, it has a complete suture between the seventh and eighth morphological antennal segments and the tube is straight-sided, although *ruidus* has this suture reduced and the tube not straight-sided. Another Indian species, *kuntiae*, resembles *africanus* in these features, but has different coloration and more slender antennal segments.

Holothrips ananthakrishnani sp. n.

(Figs 158, 159)

[*Polyphemothrips minor* Hood; Ananthakrishnan, 1969: 306–307. Misidentification.]

FEMALE (MACROPTERA). Colour brown to dark brown; metathorax and anterior portion of abdomen somewhat paler; all femora with extreme apices yellowish, all tibiae and tarsi whitish yellow; A1 brownish yellow, A2 to A4 yellow, A4 shaded with pale brown apically, A5 yellowish at basal two-fifths, brown at the rest, A6 and A7 brown to dark brown; wings shaded with pale grey, major setae hyaline.

Head (Fig. 158) about 1·1 times as long as broad, dorsal surface weakly sculptured laterally, not strongly elevated; cheeks weakly, but arcuately rounded; POS expanded at apex, about one-third length of head. Eyes 0·28–0·29 times as long as head. Antennae 1·88–1·92 times as long as head; A3 and A4 subequal in length; suture between MA7 and MA8 complete. Mouth-cone long and pointed. Pronotum 1·79–1·95 times as broad as long, major setae expanded at apex. Pelta bell-shaped or rather triangular, with a pair of micro-pores. B1(T2–T8) and B2(T3 and T8) expanded at apex, B2(T4 and T5) variable in shape at apex, usually nearly pointed, sometimes blunt or very weakly expanded, B1(T9) and B2(T6, T7 and T9) sharply pointed at apex. Tube (Fig. 159) almost straight-sided, 0·70–0·71 times as long as head, 2·34 times as long as basal width, surface smooth. Anal setae almost as long as tube or a little longer.

Measurements of holotype female in μm. Total L about 3600 (distended). Head L 331, W 296; eye L 92–95, W 77–82. Pronotum L 202, W 362; forewing L about 1200. Pelta L 126, W 158. Tube L 234, basal W 100, apical W 45. A1 to A7 L(W): 66(56); 82(40); 107(46); 108(47); 87(41); 76(36); 92(31).

Length of setae: POS 107–110. Prothoracic AA 80–86, AM 56–61, ML 86–88, PA 92–95, EPIM about 100. SWS1 62–70, SWS2 92, SWS3 102–108. B1(T9) 245–255, B2(T9) 255–257. Anals 240–250.

MALE (MACROPTERA). Colour very similar to female. Pronotum well developed, with a strong median line; forefemora more or less enlarged, foretarsal tooth stouter; sternal reticulated areas present on S5 to S7; tube 0·65 times as long as head, 2·05–2·08 as long as basal width.

Measurements of paratype male in μm. Total L 2650 (distended). Head L 316, W 275; eye L 82–88, W 70–76. Pronotum L 230, W 367; forewing L 1160. Pelta L 125, W ?. Tube L 206, basal W 99, apical W 44. A1 to A7 L (W): 56(53); 76(34); 98(43); 102(41); 86(36); 76(35); 87(26).

Length of setae: POS 174–176. Prothoracic AA 80–86, AM 56–61, ML 107–112, PA 112, EPIM about 100. SWS1 62–64, SWS2 92–96, SWS3 97–107. B1(T9) 230–240, B2(T9) 58–60. Anals 230–240.

Holotype ♀ (mac.), **India**: Kerala, Ranni Forest, on dry twigs, 18.xi.1971 (*T. N. Ananthakrishnan*) (TNA).

Paratypes. **India**: 1 ♂, Kerala, Kulanthupuzha, on decayed twigs, 13.xii.1968 (*T. N. Ananthakrishnan*) (SO); 1 ♂, Kerala, Aryankavu, on dry twigs, 12.xi.1969, 1 ♀, 18.xi.1970 (*T. N. Ananthakrishnan*) (BMNH); 1 ♀, Mysore, Kiruvatti Forest, 17.ix.1969 (*T. N. Ananthakrishnan*) (SO).

COMMENTS. This species had been recorded from India by Ananthakrishnan under the name *minor* (Hood). However, the true *minor* from South America is quite distinct in most features. The cheeks of *ananthakrishnani* are weakly rounded, whereas those of *minor* are shallowly emarginate.

In general appearance, this species resembles *porifer* described below from Japan and Taiwan, and the differences between them are discussed under that species.

Holothrips andamanensis (Sen) comb. n.

(Fig. 136)

Polyphemothrips andamanensis Sen, 1980: 353–355. Holotype ♀, Andaman Is (Zoological Survey of India) [1 ♀ paratype examined].

Female (macroptera). Bicolorous yellow and brown; prothorax, anterior margin of mesothorax, mid and hindfemora brown; forefemora shaded with brown; abdomen shaded with pale brown, darkened marginally; tube orange yellow, apex shaded with grey; A5 dark brown at apical third, A6 dark brown at apical half, A7 fully dark brown; portions other than above yellow.

POS, prothoracic major setae, SWS, B1(T2–T8) and B2(T3–T6 and T8) expanded at apex, B1(T9) and B2(T7 and T9) sharply pointed; A7 with a reduced suture between MA7 and MA8; pelta bell-shaped, with a pair of micro-pores; tube (Fig. 136) slightly constricted at basal fourth and apex, at least not straight-sided, 0·68 times as long as head, about 2·4 times as long as basal width, surface smooth; anal setae a little shorter than tube.

Material examined

Andaman Is: 1 ♀ (paratype), Garacharma, Port Blair, on dry twigs, 30.iii.1979 (*T. N. Ananthakrishnan & S. Sen*) (Zoological Survey of India).

Comments. This species is very similar to *indicus* from India, but it can easily be distinguished by the following features: A7 with a reduced suture between MA7 and MA8; tube longer, not straight-sided, slightly constricted at basal fourth and apex; WRS on T7 well developed.

Holothrips andrei sp. n.

(Figs 78–80)

Female (macroptera). Colour dark brown; pterothorax and anterior portion of abdomen somewhat paler; all tibiae brown at basal halves, yellow at apical halves; A1 and A4 to A7 dark brown, A2 dark brown with pale apex, A3 yellowish brown, shaded with dark brown apically; wings pale, weakly shaded with pale brown, major setae yellowish.

Head (Fig. 78) about 1·3 times as long as broad, dorsal surface sculptured postero-laterally, not strongly elevated; cheeks almost straight or a little rounded, very weakly narrowed towards base; POS well developed, about 0·4 times as long as head, expanded at apex. Eyes small, shorter than 0·3 times as long as head. Antennae 2·2–2·3 times as long as head; A7 (Fig. 80) with complete (or nearly complete) suture between MA7 and MA8. Mouth-cone short and not pointed. Pronotum about 2·0 times as broad as long; major setae expanded at apex. Forewings each with 13–15 DC; SWS expanded at apex, SWS3 very long, almost twice the length of SWS1 or more. Foretarsal tooth short, directed forwards. Pelta bell-shaped, a little broader than long, sculptured weakly, micro-pores absent. B1(T2–T8) and B2(T3–T5 and T8) expanded at apex, B2(T6) nearly pointed or weakly expanded at apex, B1(T9) and B2(T7 and T9) sharply pointed. Tube (Fig. 79) almost straight-sided, gradually narrowed towards apex, about 0·75 times as long as head, 2·18 times as long as basal width, surface smooth. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L about 3400 (distended). Head L 341, W 260; eye L 88, W 84. Pronotum L 173·5, W 347; forewing L 1290, W 118. Tube L 255, basal W 117, apical W 57·5. A1 to A7 L(W): 76·5(61); 76(41); 127·5(51); 132·5(53); 122·5(50); 107(46); 117(36).

Length of setae: POS 134–140. Prothoracic AA 60–65, AM 56–58, ML 76–80, PA 133–138, EPIM 95–102. SWS1 61–64, SWS2 92–102, SWS3 138–148. B1(T9) 290–300, B2(T9) 290–295. Anals 255–265.

Male. Unknown.

Holotype ♀ (mac.), **West Malaysia**: Kuala Lumpur, on dead branches, 29.xii.1969 (*R. G. & F. Andre*) (BMNH).

Paratype. **West Malaysia**: 1 ♀, same data as holotype, but 24.xii.1969 (BMNH).

Comments. The shapes of the antenna, tarsal tooth and pelta of this species are somewhat similar to those of *cracens* and its relatives. However, it can be distinguished by a combination of the following features: body uniformly dark brown; POS expanded at apex; cheeks weakly swollen.

Holothrips angulatus (Priesner) comb. n.

Cratothrips angulatus Priesner, 1927: 495–496. Holotype ♀, Corsica [destroyed].

Abiastothrips angulatus (Priesner) zur Strassen, 1974: 119–120.

The status of this species is not clear, because the holotype female has been destroyed.

Holothrips angulus sp. n.

(Figs 121, 122)

FEMALE (MACROPTERA). Colour brown, partly yellow; head brown, partly tinged with yellow; prothorax slightly darker than head, mesothorax almost concolorous with head, but tinged with grey, metathorax yellowish; abdomen pale brown to brown, gradually darkened posteriorly; tube yellow to orange yellow, with dark extreme apex; all femora brown, with apices somewhat paler, foretibiae yellow, mid and hindtibiae whitish yellow; A1 and A2 brown, A2 with pale apex, A3 yellow, shaded with brown at apical third, A4 to A7 dark brown; wings shaded with greyish brown; major setae yellowish.

Head (Fig. 121) 1·33 times as long as broad, broadest across level of posterior margins of eyes, elevated dorsally, dorsal surface clearly sculptured; cheeks angulate just behind eyes, then distinctly emarginate; POS expanded at apex. Eyes about 0·25 times as long as head. Antennae about twice the length of head; A7 with a reduced suture between MA7 and MA8. Mouth-cone short and not pointed. Pronotum about 1·9 times as broad as long; major setae expanded at apex, AM longer than AA. Epimeral suture incomplete. Forewings each with 12–13 DC; SWS expanded at apex. Foretarsal tooth directed forwards. Pelta bell-shaped, longer than broad, sculptured weakly, micro-pores absent. B1(T2 to T8) and B2(T3, T4 and T8) expanded at apex, B1 (T9) and B2(T5 and T6) very weakly expanded or nearly pointed, B2(T7 and T9) long and sharply pointed. Tube (Fig. 122) almost straight-sided, surface smooth, about 0·6 times as long as head, 2·33 times as long as basal width. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L about 3400 (distended). Head L 387, W 290; eye L 97, W ?82. Pronotum L 208, W 393; forewing L 1274. Pelta L 145, W 178. Tube L 235, basal W 101, apical W 50. A1 to A7 L(W): 81·5(66); 76(45); 112(57); 138(60); 128(51); 106(46); 117(35·5).

Length of setae: POS 95–100. Prothoracic AA 50–60, AM 66–69, ML 76–86, PA 87–92, EPIM 87–90. SWS1 63–65, SWS2 85–88, SWS3 105–112. B1(T9) 194–200, B2(T9) 240–245. Anals about 240.

MALE (MICROPTERA). Colour paler than female; head, prothorax and mesothorax yellowish brown; forefemora brownish yellow. Head 1·28 times as long as broad; eyes and ocelli smaller; B1(T9) sharply pointed; tube about 0·5 times as long as head, 1·77 as long as basal width, ventral surface with transverse rows of sculpture; sternal reticulated areas absent.

Measurements of paratype male in μm. Total L about 2500 (distended). Head L 321, W 250; eye L 66, W 56. Pronotum L 244, W 367; forewing L 189. Tube L 163, basal W 92, apical W 42. A1 to A7 L(W): 66(57); 70(37); 95(46); 106(46); 102(44); 86(41); 97(33).

Holotype ♀ (mac), **Singapore**: Macritchie Park, on dead twigs and leaves, 19.viii.1980 (*L. A. Mound*) (BMNH).

Paratype. **Singapore**: 1 ♂, collected with holotype (BMNH).

Non-paratypic material. **West Malaysia**: 1 ♀, Tapah, on dead leaves, 30.vii.1976 (*S. Okajima*) (SO).

COMMENTS. This species resembles *cracens* in general appearance, but it can easily be distinguished by the following features. Colour darker, mainly brown; cheeks angulate just behind eyes; epimeral suture incomplete; pelta without micro-pores; anal setae almost as long as tube.

The female listed above from West Malaysia has nearly complete epimeral sutures, although the holotype female has incomplete ones.

Holothrips antennalis sp. n.

(Figs 85–88)

FEMALE (MACROPTERA). Colour brown; head somewhat darker than prothorax; metathorax paler than pro- and mesothorax; tube yellow, paler posteriorly, with brown apex; foretibiae shaded with brown, mid and hindtibiae yellow; antennae brown to dark brown, A1 and A5 to A7 a little darker, basal half of A3 yellowish; wings shaded with pale brown.

Head (Fig. 85) 1·22 times as long as broad, dorsal surface almost smooth, without distinct sculpture, slightly elevated; cheeks shallowly emarginate; POS well developed, longer than 0·4 times as long as head, sharply pointed at apex; postocellar setae much longer than diameter of ocellus. Eyes small, shorter than 0·3 times as long as head. Posterior ocelli well separated from eyes. Antennae about 2·5 times as long as

head; A7 (Fig. 86) the longest, with a complete suture between MA7 and MA8. Mouth-cone short and not rounded; maxillary stylets distinctly angulate laterally in mouth-cone. Pronotum about 2·4 times as broad as long; all major setae pointed at apex, AM well developed, almost as long as AA. Forewings each with 6–8 DC; SWS pointed at apex. Pelta (Fig. 87) irregularly bell-shaped, broader than long, sculptured weakly, micro-pores absent. All B1 and B2 setae on abdominal tergites pointed at apex. Tube (Fig. 88) about 0·8 times as long as head, 2·35 times as long as basal width, surface smooth. Anal setae almost as long as tube or a little shorter.

Measurements of holotype female in μm. Total L 3210 (distended). Head L 341, W 280; eye L 81, W 71–76. Pronotum L 153, W 367; forewing L 1186. Pelta L 135, W 158. Tube L 275, basal W 117, apical W 55. A1 to A7 L(W): 76·5(66); 77(45); 133(50); 138(51); 118(45); 117(41); 153(32).

Length of setae: POS 148. Prothoracic AA 89–94, AM 91–94, ML 102–112, PA 128–132, EPIM 123–128. SWS1 71·5–77, SWS2 100–102, SWS3 117–120. B1(T9) 286, B2(T9) 275–286. Anals 230–265.

MALE. Unknown.

Holotype ♀ (mac.), **Singapore**: (detailed locality unknown), on dead twigs, 4.xi.1973 (*L. A. Mound*) (BMNH).

COMMENTS. The seventh antennal segment of this species is exceptionally long, much longer than the third segment, and with a complete suture between the morphological seventh and eighth segments.

Holothrips apoensis sp. n.

(Figs 33–36)

FEMALE (MACROPTERA). Colour brown to dark brown; head slightly darkened laterally; metathorax paler posteriorly; tube somewhat darker, paler at apical fifth, with dark extreme apex; A1 and A2 brown almost concolorous with head, A3 to basal half of A6 yellowish, apices of A4 and A5 shaded with pale brown, apical half of A6 and whole of A7 brown, a little paler than head; all tibiae brown with paler apices; forewings each with a longitudinal brown stripe; major setae yellowish, anal setae somewhat darker.

Head (Fig. 33) 1·06–1·10 times as long as broad, dorsal surface sculptured, but ocellar region smooth; cheeks subparallel, weakly constricted at base; POS blunt, much shorter than eye. Antennae 2·17–2·20 as long as head; A7 (Fig. 35) with a reduced suture between MA7 and MA8. Mouth-cone short; maxillary stylets 25–30 μm apart from each other, reaching a level of POS, with weak maxillary bridge. Pronotum 1·88–1·95 times as broad as long, weakly sculptured generally; major setae weakly expanded at apex, AA longer than AM. Forewings each with 18–23 DC; SWS1 expanded, SWS2 and SWS3 blunt or nearly pointed at apex. Pelta (Fig. 36) with fine reticulation, micro-pores absent. B1(T2–T8) and B2(T3–T8) weakly expanded or blunt at apex, B1(T9) and B2(T9) nearly pointed at apex. Tube (Fig. 34) 1·09–1·10 times as long as head, 3·00–3·15 times as long as basal width, surface with weak reticulation. Anal setae shorter than tube.

Measurements of large (small) female in μm. Total L about 3500 (about 3100) (distended). Head L 321 (290), W 270 (255); eye L 117 (107). Pronotum L 204 (178), W 398 (336); forewing L 1622 (1410). Tube L 352 (321), basal W 117 (102), apical W 56 (48). A1 to A7 L/W: 76(66)/66(58); 81(71)/41(38); 117(102)/51(47); 127(114)/51(51); 109(97)/43(41); 92(81)/38(36); 97(97)/28(28).

Length of setae: POS 76–82 (61–64). Prothoracic AA 66–69 (60–62), AM 41–46 (31–35), ML 82–86 (56–71), PA 107–112 (87–97), EPIM 117–125 (102–107). SWS1 61–65 (56–59), SWS2 77–81 (66–72), SWS3 138–143 (138–142). B1(T9) 214–230 (204–219), B2(T9) 214 (204). Anals 255 (240).

MALE (MACROPTERA). Colour very similar to female, but foretibiae somewhat paler. Head 1·19–1·23 times as long as broad; eyes 0·39 times as long as head; maxillary stylets not reaching level of POS; tube 1·06–1·09 times as long as head; S5 and S6 with reticulated areas.

Measurements of large (small) male in μm. Total L about 3200 (about 3000) (distended). Head L 300 (285), W 245 (240); eye L 117 (112). Pronotum L 285 (214), W 382 (367); forewing L 1526 (2473). Tube L 319 (314), basal W 107 (102), apical W 56 (51). A1 to A7 L/W: 76(71)/61(61); 76(71)/38(35); 117(110)/51(46); 117(114)/51(46); 107(102)/41(38); 83(81)/36(34); 97(94)/28(27).

Length of setae: POS 97–107 (92–102). Prothoracic AA 66–75 (56–65), AM 24–25 (36–41), ML 86–97 (86–90), PA 102–112 (97–102), EPIM 107–117 (102–112). SWS1 66–71 (61–65), SWS2 97–102 (81–84), SWS3 173–179 (148–153). B1(T9) 219–230 (194–204), B2(T9) 61 (56–59). Anals 250 (255).

Holotype ♀ (mac.), **Philippines**: Mindanao, Mt Apo, Agko, *c.* 1300 m, on dead leaves, 3.viii.1979 (*S. Okajima*) (BMNH).

Paratypes. **Philippines**: 3 ♀, 2 ♂, Mindanao, collected with holotype (SO; 1 ♀, 1 ♂, BMNH).

COMMENTS. The maxillary stylets of this species are separated from each other, although those of most *Holothrips* species are close together in the middle of head. Moreover, it has a weak maxillary bridge. These interesting features are also found in some other South East Asian species which are newly described below. This group of species is here referred tentatively to the *apoensis*-group.

This species resembles *peninsulae* described below from West Malaysia, but it can easily be distinguished by the following: A3 and A4 yellowish; tube more slender, 3·00–3·15 times as long as basal width; mouth-cone shorter; B1(T9) shorter, less than 0·7 times as long as tube; weakly sculptured on the region between both POS.

Holothrips armatus sp. n.

(Figs 41, 42)

MALE (MACROPTERA). Colour brown; abdomen gradually darkened towards apex; tube the darkest; mid and hindtibiae paler apically; antennae brown, darkened distally, A3 with yellowish basal half; wings shaded with pale brown, major setae yellowish.

Head (Fig. 41) about 1·1 times as long as broad, dorsal surface not elevated, weakly sculptured laterally and posteriorly; cheeks almost straight, gradually narrowed towards base; POS weakly expanded at apex. Eyes well developed, about 0·4 times as long as head. Antennae about twice the length of head; A7 with a reduced suture between MA7 and MA8. Mouth-cone short and not pointed; maxillary stylets about 25 μm apart from each other, reaching a level of POS, with maxillary bridge. Pronotum 1·5 times as broad as long; major setae expanded at apex. Forewings each with 10–12 DC; SWS expanded at apex. Forefemora enlarged, with a hump at middle of inner margin; foretarsal tooth stout. Pelta bell-shaped, broader than long, micro-pores absent. B1(T2–T9) and B2(T3–T8) expanded or blunt at apex, at least not sharply pointed, B2(T9) short, stout and pointed at apex. Sternal reticulated areas absent. Tube (Fig. 42) almost as long as head or a little longer, dorsal surface sculptured. Anal setae much shorter than tube.

Measurements of holotype male in μm. Total L 2250 (distended). Head L 235, W 214; eye L 92, W 62–64. Pronotum L 197, W 296; forewing L about 1000. Pelta L 107, W 130. Tube L 242, basal W 102, apical W 43. A1 to A7 L(W): 56(52); 58(36); 81(40); 82(40); 76(32); 61(26); 66(25·5).

Length of setae: POS 81–85. Prothoracic AA 40–45, AM 45–48, ML 62–66, PA 77–82, EPIM 80–85. SWS1 45–50, SWS2 72, SWS3 110–113. B2(T9) 66. Anals about 200.

FEMALE. Unknown.

Holotype ♂ (mac.), **Brunei**: Bukit Sulang, nr Lamunin, fogging (*Shorea jahovensis*), 20.viii.–10.ix.1982 (*N. Stork*) (BMNH).

Paratype. **Brunei**: 1 ♂, same data as holotype (BMNH).

COMMENTS. This species belongs to the *apoensis*-group, with the maxillary stylets slightly apart from each other, and with a maxillary bridge. From the other members of this group, *armatus* can be distinguished by the smaller body, short antennal segments and the expanded postocular setae.

Holothrips attenuatus sp. n.

(Figs 190, 191, 197)

FEMALE (MACROPTERA). Colour uniformly dark brown; tube with base and apex somewhat paler; A3 yellowish at extreme base; wings shaded with pale brown, major setae yellowish.

Head (Fig. 190) 1·04–1·06 times as long as broad, dorsal surface weakly sculptured, not strongly elevated; cheeks weakly rounded; POS blunt or nearly pointed at apex, 0·35 times as long as head. Eyes about 0·3 times as long as head. Antennae about 2·2 times as long as head; A4 a little longer than A3, or subequal; suture between MA7 and MA8 incomplete. Mouth-cone long and pointed. Pronotum 1·93 times as broad as long, weakly sculptured posteriorly with transverse rows of reticulation; AM setae slender, almost sharply pointed at apex, all other major setae blunt. Forewings each with 17–20 DC; SWS blunt, but SWS2 and SWS3 nearly pointed. Foretarsal tooth directed forwards. Pelta (Fig. 197) bell-shaped, but slender, with distinct sculpture, micro-pores absent. All B1 and B2 setae sharply pointed at apex, but sometimes B1(T2 and T8) and B2(T3 and T8) blunt. Tube (Fig. 191) almost straight-sided, 0·78 times as long as head, about 2·2 times as long as basal width, surface almost smooth, but with very weak sculpture. Anal setae almost as long as tube or a little shorter.

Measurements of holotype female in μm. Total L 4050 (distended). Head L 357, W 337; eye L 110–112, W 86–90. Pronotum L 230, W 444; forewing L 1643. Pelta L 178, W 153. Tube L 280, basal W 127, apical W 60. A1 to A7 L(W): 82(66); 82(46); 130(59); 140(61); 117(50); 82(43); 112(36).

Length of setae: POS about 125. Prothoracic AA about 80, AM about 25, ML about 85, PA 85–92, EPIM 120–130. SWS1 82–87, SWS2 112–132, SWS3 127–153. B1(T9) 209–214, B2(T9) 177–180. Anals 270–280.

Male (macroptera). Colour very similar to female. Head 1·07–1·08 times as long as broad; POS nearly pointed at apex; pronotum with a strong median line, 1·67–1·92 times as broad as long; forewings each with 15–18 DC; foretarsal tooth stout, rather triangular; sternal reticulated areas not visible or absent; tube 0·74 times as long as head, 1·95–1·96 times as long as basal width.

Measurements of paratype male in μm. Total L 3030 (distended). Head L 296, W 275; eye L 86–87, W 71–73. Pronotum L 232, W 388; forewing L 1420. Pelta L 1443, W 123. Tube L 219, basal W 112, apical W 53. A1 to A7 L(W): 71(57); 77(40); 112(51); 117(52); 102(44); 78(42); 102(35).

Length of setae: POS 100–110. Prothoracic AA about 70, AM about 50, ML 70–75, PA 62–92, EPIM about 80. SWS1 62, SWS2 120–124, SWS3 128–138. B1(T9) 202–204, B2(T9) 72–82. Anals about 240.

Holotype ♀ (mac.), **Taiwan**: Nantou Hsien, Nanshanchi, on dead leaves, 30.iv.1983 (*H. Yamazaki*) (BMNH).

Paratypes. **Taiwan**: 1 ♀, collected with holotype; 2 ♀, 2 ♂, Nantou Hsien, foot of Mt Nankao-shan, Wanta, on dead branches, 1.iv.1984 (*S. Okajima*) (SO; 1 ♀, 1 ♂, BMNH).

Comments. This species resembles *yuasai* from Japan in the proportions of the head, but it can be distinguished by the following features. Antennal segments uniformly dark brown, only with yellowish extreme base of A3; most of B1 and B2 setae on tergites pointed at apex; tube almost straight-sided; anal setae almost as long as tube; sternal reticulated areas apparently absent in male. Another Japanese species, *hagai*, described below is also similar to this species, but it has a different type of tube which is strongly constricted at basal third and apex.

The anteromarginal prothoracic setae of the holotype female are reduced. This is probably an aberration, as these setae are well developed in each of the five paratypes.

Holothrips australis (Mound)

Adelothrips australis Mound, 1974: 12–15. Holotype ♀, Australia (Australian National Insect Collection, Canberra) [1 ♀, 1 ♂ paratypes examined].
Holothrips australis (Mound) Mound & Palmer, 1983: 94.

Female (macroptera). Head about 1·2 times as long as broad, dorsal surface elevated; cheeks emarginate; POS short and expanded at apex; antennae short, shorter than 1·5 times as long as head, suture between MA7 and MA8 complete; inter-antennal projection somewhat broad (about 45 μm); mouth-cone short, not pointed, maxillary palpi small; pelta rather triangular, micro-pores absent; B1(T2–T8) and B2(T3–T5 and T8) expanded at apex, B2(T6) variable in shape, pointed, blunt or weakly expanded, B1(T9) and B2(T7 and T9) sharply pointed; tube short, shorter than 0·5 times as long as head, constricted at basal third and apex, surface smooth.

Material examined

Australia: 1 ♀, 1 ♂ (paratypes), South Australia, Bordertown, in suction trap, 16.xi.1964 (*T. White*) (BMNH); 1 ♀, nr Adelaide, on aerial trap (500′) (*T. White*) (BMNH).

Comments. This species is easily distinguished from all the other species of the genus by the short antennae which are a little shorter than 1·5 times as long as head, and by the short tube which is shorter than half the length of the head.

Holothrips breviceps sp. n.

(Figs 166, 167)

Female (macroptera). Colour brown; mesothorax somewhat paler; A2 yellowish, A3 yellow, tinged with brown at apical third, A4 to A7 brown to dark brown, but A4 tinged with yellow at basal half; all tibiae and tarsi yellow; wings slightly shaded with pale brown, major setae hyaline.

Head (Fig. 166) almost as long as broad, dorsal surface sculptured postero-laterally, not strongly elevated; cheeks distinctly swollen just behind eyes, weakly, but arcuately rounded, then gradually narrowed towards base; POS expanded at apex, shorter than one-third length of head. Eyes small,

0·24–0·25 times as long as head, slightly prolonged on ventral surface. Antennae about twice the length of head; sense cones long and slender; A4 distinctly longer than A3; A7 with an incomplete suture between MA7 and MA8. Mouth-cone long and pointed. Pronotum 1·74–1·76 times as broad as long; major setae expanded at apex. Forewings each with 11–13 DC; SWS expanded at apex. Foretarsal tooth somewhat slender, but small, directed inwards. Pelta bell-shaped, broader than long, with a pair of micro-pores. B1(T9) and B2(T6, T7 and T9) sharply pointed at apex, B1(T2–T8) and B2(T3–T5 and T8) expanded at apex. Tube (Fig. 167) almost straight-sided, very weakly narrowed at apex, about 0·7 times as long as head, 2·25–2·26 times as long as basal width. Anal setae a little shorter than tube.

Measurements of holotype female in μm. Total L about 3000 (distended). Head L 316, W 306; eye L 76–80, W 76–79. Pronotum L 214, W 372; forewing L 1190. Pelta L 214, W 372. Tube L 219, basal W 97, apical W 41. A1 to A7 L(W): 66(56); 70(40); 91(47); 112(45); 97(40); 85(37); 92(28).

Length of setae: POS about 80. Prothoracic AA 60–65, AM 51–57, ML 70–75, PA 87–92, EPIM 85–88. SWS1 50–52, SWS2 61–66, SWS3 62–82. B1(T9) 195–200, B2(T9) about 240. Anals 204.

MALE. Unknown.

Holotype ♀ (mac.), **West Malaysia**: Genting Highlands, 30 ml. E. of Kuala Lumpur, 4500′, on dead wood and leaves, 28.ix.1973 (*L. A. Mound*) (BMNH).

Paratypes. **West Malaysia**: 2 ♀, collected with holotype (BMNH).

COMMENTS. In general features or appearance, this species resembles *castanicolor* and *cupreus* which are newly described below from West Malaysia and the Philippines respectively. However, the head of this species is almost as long as broad, although the other two species have rather longer heads.

Holothrips brevicollis sp. n.

(Figs 9, 10)

FEMALE (MACROPTERA). Colour dark brown; A3 brownish yellow, shaded with brown at apical half; tube blackish brown, with pale base, gradually paler towards apex; forewings each with two obscure longitudinal brown stripes; major setae brownish.

Head (Fig. 9) 1·70–1·74 times as long as broad, dorsal surface elevated, sculptured with transverse rows of reticulation; cheeks almost straight, subparallel; POS about one-third length of head, blunt at apex. Eyes about 2·5 times as long as head. Antennae about 1·7 times as long as head; sense-cones short, shorter than 60 μm; A7 with a reduced suture between MA7 and MA8. Mouth-cone short. Pronotum very short, about 2·5 times as broad as long; major setae blunt or weakly expanded at apex, AM the longest, longer than twice length of AA. Forewings each with 21–23 DC; SWS1 and SWS2 blunt at apex, SWS3 long and sharply pointed. Foretarsal tooth small and directed forwards. Pelta longer than wide, sculptured weakly, micro-pores absent. B1(T9) and B2(T9) long and sharply pointed, other B1 and B2 setae on tergites weakly expanded or blunt at apex. Tube (Fig. 10) about 0·6 times as long as head, about 1·8 times as long as basal width, almost straight-sided, gradually narrowed towards apex, surface smooth. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L 4450 (distended). Head L 460, W 264; eye L 117, W 80–92. Pronotum L 163, W 414. Pelta L 153. Tube L 280, basal W 156, apical W 63·5. A1 to A7 L(W): 77(61); 82(45); 153(59); 138(54); 108(49); 96(46); 97(35).

Length of setae: POS 158–160. Prothoracic AA 60–66, AM 137–148, ML 45–50, PA 85–92, EPIM 108–114. SWS1 70–72, SWS2 102–118. SWS3 235–240. B1(T9) 367–378, B2(T9) 336–347. Anals 275–280.

MALE (MACROPTERA). Colour very similar to female. Head 1·66–1·74 times as long as broad; pronotum 1·97–2·05 times as broad as long; forewings each with 21–24 DC; foretarsal tooth wide-based, directed inwards; sternal reticulated areas absent, but S5 to S7 each with a dark transverse area which may be a vestige of the reticulated area; tube 0·66 times as long as head, 1·96 times as long as basal width.

Measurements of paratype male in μm. Total L about 4300 (distended). Head L 423, W 255; eye L 117, W 79–84. Pronotum L 211, W 433; forewing L 1750. Pelta L 178. Tube L 278, basal W 142, apical W 61. A1 to A7 L(W): 71(66); 76(41); 153(55); 138(53); 112(43); 94(40); 107(35).

Length of setae: POS 158–163. Prothoracic AA 56–?60, AM 138–143, ML 61–87, PA 98–102, EPIM 112–125. SWS1 82–87, SWS2 120–123, SWS3 230. B1(T9) 337–345, B2(T9) 66–68. Anals about 280.

Holotype ♀ (mac.), **Brunei**: Bukit Sulang, nr Lamunin, fogging (*Shorea macrophylla*), 20.viii.–10.ix.1982 (*N. Stork*) (BMNH).

Paratypes. **Brunei**: 1 ♀, 1 ♂, same data as holotype (BMNH); 1 ♀, 1 ♂, data very similar to holotype, but fogging (*Shorea jahovensis*) (BMNH).

COMMENTS. This species may be related to *brevitubus* and *parallelus*, described below, from the Philippines and Sulawesi respectively. These three species have elongate heads which are sculptured with transverse rows of fine reticulation, a small prothorax and short tube. However, *brevicollis* can easily be distinguished by the darker colouration and the large body size. Moreover, the long anteromarginal prothoracic setae, which are much longer than the anteroangular setae, are unusual in the genus.

Holothrips brevitubus sp. n.

(Figs 13–16)

FEMALE (MACROPTERA). Colour pale brown; sclerotized weakly; tube brown with pale base; A1 and A2 pale brown, concolorous with head, A3 the palest, pale brownish yellow, A4 to A6 pale brownish yellow, shaded with brown at apical halves, A7 brown; all tibiae and tarsi whitish yellow; wings shaded with pale grey; major setae yellowish.

Head (Fig. 13) about 1·4 times as long as broad, slightly elevated dorsally; dorsal surface sculptured with transverse rows of weak reticulation; cheeks almost straight, gradually narrowed towards base; POS weakly expanded at apex, about 0·3 times as long as head or a little shorter. Eyes shorter than 0·3 times as long as head. Antennae 1·75 times as long as head; A7 (Fig. 16) with a reduced suture between MA7 and MA8. Mouth-cone short. Pronotum about 2·0 times as broad as long, surface smooth, weakly sculptured posteriorly; all major setae weakly expanded at apex, AM most slender, but very weakly expanded at apex. Probasisternum weak. Foretarsal tooth (Fig. 15) short, directed forwards. Forewings each with 5–6 DC. Pelta weakly developed, with very weak sculpture, micro-pores absent. WRS on T7 undeveloped, anterior pair reduced, posterior pair short and straight. B1(T2–T8) and B2(T8) weakly expanded, B1(T9) and B2(T3–T7 and T9) sharply pointed or nearly pointed at apex. Tube (Fig. 41) about 0·55 times as long as head, about 1·8 times as long as basal width, surface smooth. Anal setae a little longer than tube.

Measurements of holotype female in μm. Total L 2650 (distended). Head L 316, W 224; eye L 87, W 69. Pronotum L 148, W 290; forewing L 1018. Tube L 173, basal W 96, apical W 45. A1 to A7 L(W): 59(53); 63(34); 92(42); 87(42); 79(34); 74(36); 76(27).

Length of setae: POS 100–105. Prothoracic AA about 40, AM 40–46, ML 45, PA 71–72, EPIM 67–72. SWS1 46–48, SWS2 52–56, SWS3 76–78. B1(T9) 193–198, B2(T9) about 220. Anals 188–198.

MALE (MACROPTERA). Colour and structure very similar to female. Pronotum and forefemora more or less enlarged; foretarsal tooth stouter, widely based, directed inwards; forewings each with 6–8 DC; S5 and S6 each with a transverse reticulated area.

Measurements of paratype male in μm. Total L 2250 (distended). Head L 286, W 189; eye L 79, W 61. Pronotum L 153, W 275; forewing L 902. Tube L 163, basal W 88, apical W 41. A1 to A7 L(W): 53(44); 51(32); 82(36); 82(37); 71(30); 67(29); 72(26).

Length of setae: POS 92–97. Prothoracic AA ?, AM 37–43, ML ?, PA 80–85, EPIM about 70. SWS1 48–50, SWS2 58–60, SWS3 85–88. B1(T9) 198–202. Anals 180–185.

Holotype ♀ (mac.), **Philippines**: Luzon, nr Daet, Bicol National Park, on dead branches, 13.viii.1979 (*S. Okajima*) (BMNH).

Paratypes. **Philippines**: 1 ♀, 1 ♂, collected with holotype; 1 ♂, Luzon, nr Lucena City, Quezon National Forest Park, on dead leaves, 16.vii.1979 (*S. Okajima*) (SO; 1 ♂, BMNH).

COMMENTS. This species is very similar to *parallelus* described below from Sulawesi. The differences between them are discussed under the latter species.

Holothrips castanicolor sp. n.

(Figs 164, 165, 173)

FEMALE (MACROPTERA). Colour brown to dark brown; head a little darker than prothorax; metathorax somewhat paler than prothorax; abdomen slightly darkened towards apex; tube dark brown at basal three-fifths, pale brown at apical two-fifths; all femora brown to dark brown, almost concolorous with body, foretibiae yellowish brown, mid and hindtibiae yellow, with shaded extreme bases; A1 and A2 brown, concolorous with head, A3 yellowish brown, with shaded apex, A4 to A7 dark brown, a little darker than head; wings shaded with pale brown, major setae yellowish.

Head (Fig. 164) 1·15 times as long as broad, dorsal surface not strongly elevated, sculptured posterolaterally; cheeks weakly rounded, weakly constricted near base; POS longer than eye, expanded at apex. Eyes about 0·25 times as long as head. Antennae 1·95 times as long as head; A4 a little longer than A3; A7 with a reduced suture between MA7 and MA8. Mouth-cone long and pointed. Pronotum 1·7 times as broad as long; major setae expanded at apex, AM shorter than AA. Forewings each with 17–18 DC; SWS expanded at apex. Foretarsal tooth directed forwards. Pelta (Fig. 173) bell-shaped, almost as long as wide or a little wider, with a pair of micro-pores. B1(T2–T8) and B2(T3 and T8) expanded at apex, B1(T9) and B2(T4–T7 and T9) sharply pointed, sometimes B2(T4) weakly expanded or blunt. Tube (Fig. 165) weakly constricted at basal third and apex, about 0·75 times as long as head, about 2·6 times as long as basal width, surface smooth. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L about 3900 (distended). Head L 398, W 347; eye L 102, W 87. Pronotum L 253, W 428; forewing L about 1700. Pelta L 158, W 163. Tube L 300, basal W 116, apical W 50. A1 to A7 L(W): 82(71); 94(45); 127(52); 133 (54); 112(44); 99(41); 102(34·5).

Length of setae: POS about 120. Prothoracic AA 80–90, AM 76–79, ML 123–128, PA 132–134, EPIM 127–130. SWS1 66–70, SWS2 91–93, SWS3 102–103. B1(T9) 316, B2(T9) 332. Anals 290.

MALE. Unknown.

Holotype ♀ (mac.), **West Malaysia**: Cameron Highland, nr Tanah Rata, Gnung Tengkolok, on dead leaves and branches, 27.v.1983 (*T. Senoh*) (BMNH).

Paratypes. **West Malaysia**: 1 ♀, collected with holotype; 1 ♀, Tanah Rata, on dead branches, 24.vii.1976 (*S. Okajima*), 1 ♀, 8.v.1981 (*W. Suzuki*) (SO; 1 ♀, BMNH).

Non-paratypic material. **West Malaysia**: 2 ♀, Cameron Highland, nr Tanah Rata, Gnung Beremban, v.1981 (*W. Suzuki*); 2 ♀, Tanah Rata, on dead branches, 24.vii.1976 (*S. Okajima*) (SO).

COMMENTS. The four non-paratypic females listed above may be small individuals of this species. They have larger head sculpture and shorter body setae, and these features are probably related to their smaller body size.

Holothrips caudatus (Bagnall)

Allothrips caudatus Bagnall, 1915: 595–596. Holotype ♀, SARAWAK (BMNH) [examined].
Polyphemothrips caudatus (Bagnall) Mound, 1968: 146.
Holothrips caudatus (Bagnall) Mound & Palmer, 1983: 94.

FEMALE (MACROPTERA). Colour brown; foretibiae a little paler; A3 yellowish at basal half; tube somewhat reddish with darker apex. Head almost as long as broad, dorsal surface sculptured laterally, not strongly elevated; POS sharply pointed, about 0·4 times as long as head; A7 with a reduced suture between MA7 and MA8; mouth-cone short; tube about 1·1 times as long as head, about 2·7 times as long as basal width.

MATERIAL EXAMINED

Sarawak: holotype ♀, Mt Matang, 11.xii.1913 (*G. E. Bryant*) (BMNH).

COMMENTS. This species was described from a unique damaged female from Sarawak, Borneo. The maxillary stylets are narrowly separated from each other, and the tube is a little longer than the head; because of these features, *caudatus* may belong to the *apoensis*-group. Somewhat similar body proportions are found in *peninsulae*, described below from West Malaysia. The differences between them are discussed under the latter species, but the status of *caudatus* is still not clear, because the unique holotype female is in poor condition.

Holothrips celebensis **sp. n.**

(Figs 181–183, 194)

FEMALE (MACROPTERA). Colour dark brown; extreme base of A3 yellowish; wings shaded with pale brown; major setae brownish yellow.

Head (Fig. 181) about 1·5 times as long as broad, dorsal surface slightly elevated, sculptured weakly; cheeks subparallel, very weakly narrowed posteriorly; POS about one-third the length of head or a little longer; blunt at apex. Eyes about 0·3 times as long as head. Antennae about 1·9 times as long as head; prominent setae on A2–A4 short, dark and blunt at apex (Fig. 183); A7 3·5 times as long as wide or longer, with an incomplete suture between MA7 and MA8. Mouth-cone pointed. Pronotum about 1·9 times as broad as long, sculptured laterally, with a strong median line; all major setae blunt at apex. Forewings each with more than 30 DC; SWS short, blunt or weakly expanded at apex. Foretarsal tooth stout. Pelta (Fig.

194) elongate, rather bell-shaped, micro-pores absent. B1(T2–T8) and B2(T3, T4 and T8) blunt at apex, B1(T9) and B2(T5–T7 and T9) nearly or sharply pointed at apex. Tube (Fig. 182) somewhat heavy, gradually narrowed towards apex and strongly constricted near apex, 0·85 times as long as head, about 2·5 times as long as basal width, surface weakly sculptured. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L about 5000 (distended). Head L 485, W 321; eye L 117–122, W 92. Pronotum L 265, W 501; forewing L 2080. Pelta L 209, W 210. Tube L 413, basal W 168, apical W 65. A1 to A7 L(W): 100(76); 92(49); 163(67); 163(62); 136(49); 117(43); 115(31).

Length of setae: POS 167–169. Prothoracic AA ?50, AM about 50, ML ?, PA 92–98, EPIM 102–107. SWS1 about 40, SWS2 77–82, SWS3 82–84. B1(T9) 430, B2(T9) 420–425. Anals 280–300.

Male (macroptera). Colour very similar to female. Head about 1·4 times as long as broad; pronotum about 1·6 times as broad as long; sternal reticulated areas present on S5 and S6 (sometimes reduced reticulated areas present on S4); tube distinctly narrowed at basal fourth and near apex, about 0·9 times as long as head, about 2·2 times as long as basal width.

Measurements of paratype male in μm. Total L 4240 (distended). Head L 398, W 287; eye L 102, W 77–85. Pronotum L 280, W 458; forewing L about 1900. Pelta L 179, W 204. Tube L 357, basal W 163, apical W 61. A1 to A7 L(W): 87(71); 87(44); 153(59); 151(54); 127(44); 112(40); 117(27).

Length of setae: POS about 150. Prothoracic AA about 60, AM less than 40, ML ?, PA 102–108, EPIM 95–110. SWS1 60, SWS2 82, SWS3 96. B1(T9) 410–430, B2(T9) 100–102. Anals 255–265.

Holotype ♀ (mac.), **Sulawesi**: nr Rantepao, Pedamaran, on dead leaves, 10.viii.1984 (*S. Okajima*) (BMNH).

Paratypes. **Sulawesi**: 1 ♀, 3 ♂, collected with holotypes (SO; 2 ♂, BMNH).

Comments. The long head of this species is more or less similar to that of *mirandus*. However, it can easily be distinguished from the latter by the following features: all tibiae dark brown; A3 dark brown with yellowish extreme base; POS much shorter than half length of head; dorso-apical setae on A2 to A4 short and blunt; tube somewhat heavy, strongly constricted near apex, surface weakly sculptured; mouth-cone pointed.

Holothrips cephalicus sp. n.

(Figs 89–91)

Female (macroptera). Colour brown to dark brown; metathorax and anterior portion of abdomen paler; tube yellow, shaded with grey or pale brown; A1 to A3 pale brownish yellow, A3 shaded with brown apically, A4 to A7 dark brown; all femora dark brown, mid and hindfemora with pale extreme bases and apices; foretibiae brown, mid and hindtibiae whitish yellow; wings shaded with pale brown, major setae yellowish.

Head (Fig. 89) about 1·4 times as long as broad, dorsal surface elevated, weakly sculptured, sculpture with many small tubercles or warts; cheeks slightly emarginate, subparallel; POS about 0·25 times as long as head, blunt or weakly expanded at apex. Eyes weakly prolonged on ventral surface. Antennae about 2·1 times as long as head; A5 longer than A3, almost as long as A4; A7 (Fig. 91) with a reduced suture between MA7 and MA8. Mouth-cone short and rounded. Pronotum 2·26 times as broad as long, small, anterior margin shallowly V-shaped, sculptured except median portion; major setae blunt at apex, AM well developed. Epimeral suture incomplete. Forewings each with 12–13 DC; SWS weakly expanded at apex. Pelta weakly developed, micro-pores absent. B1(T2–T8) and B2(T8) blunt or weakly expanded at apex, B1(T9) and B2(T3–T7 and T9) nearly pointed or sharply pointed at apex. Tube (Fig. 90) almost straight-sided, 0·57 times as long as head, 2·38 times as long as basal width, surface smooth. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L about 3000 (distended). Head L 367, W 258; eye L 87, ventral L 107, W 77. Pronotum L 158, W 357; forewing L 1155. Tube L 209, basal W, apical W 40. A1 to A7 L(W): 61(56); 66(42); 122(54); 137(56); 133(50); 107(45); 106(31).

Length of setae: POS 88–92. Prothoracic AA 65–70, AM 74–77, ML 63–67, PA 92–97, EPIM 77–87. SWS1 66–68, SWS2 83–88, SWS3 87–91. B1(T9) 270–275, B2(T9) 245–250. Anals 204–206.

Male. Unknown.

Holotype ♀ (mac.), **Brunei**: Bukit Sulang, nr Lamunin, fogging (*Shorea jahovensis*), 20.viii.–10.ix.1982 (*N. Stork*) (BMNH).

COMMENTS. This species is somewhat similar to *cracens* and its relatives in appearance. However, the unique female on which it is based has many small warts on the dorsal surface of the head, and has a comparatively long fifth antennal segment which is longer than the third segment.

Holothrips citricornis (Bagnall)

(Fig. 84)

Cryptothrips citricornis Bagnall, 1913: 296. Holotype ♂, TANZANIA (BMNH) [examined].
Polyphemothrips citricornis (Bagnall) Mound, 1968: 147.
Holothrips citricornis (Bagnall) Mound & Palmer, 1983: 94.

MALE (MICROPTERA). Colour dark brown; A1 to A5 yellow, A6 yellow, shaded with pale brown at apical half, A7 pale brown; all femora dark brown, with pale extreme apices; all tibiae and tarsi yellow. Head (Fig. 84) 1·34 times as long as broad; cheeks almost straight or very weakly rounded, weakly constricted subapically, widest just behind eyes; POS almost as long as eyes, expanded at apex; suture between MA7 and MA8 complete; prothoracic major setae expanded at apex, but AM reduced; B1(T9) and B2(T7 and T9) sharply pointed at apex, other major setae on tergites expanded; tube almost straight-sided, 0·67 times as long as head, surface smooth.

MATERIAL EXAMINED

Tanzania (Tanganyika): holotype ♂, Arusha, x.–xi.1905 (*Katona*) (BMNH).

COMMENTS. This species is known only from the holotype micropterous male. It may be distinguished from all the other species of the genus by a combination of the following features: A1 to A5 yellow, in contrast to the dark brown head; prothoracic AM reduced; suture between MA7 and MA8 complete; head more than 1·3 times as long as broad.

Holothrips cracens (Ananthakrishnan)

Polyphemothrips cracens Ananthakrishnan, 1968: 55–56. Holotype ♀, INDIA (TNA) [examined].
Holothrips cracens (Ananthakrishnan) Mound & Palmer, 1983: 94.

FEMALE (MACROPTERA). Bicolorous yellow and brown; head yellow, tinged with brown to dark brown; thorax yellow, pterothorax with dark lateral margins; abdomen yellow, lateral margins shaded with pale brown; tube yellow, with apex grey; legs yellow, femora shaded with pale brown, mid and hindtibiae whitish; A1 to A3 yellow, A4 brownish yellow, with somewhat dark apex, A5 to A7 brown to dark brown, basal two-thirds of A5 paler. Head about 1·3 times as long as broad; POS weakly expanded at apex; A7 with an incomplete (nearly complete) suture between MA7 and MA8; mouth-cone very short; pronotum small, major setae expanded at apex; forewings each with 11–13 DC; pelta with a pair of micro-pores; B1(T2–T8) and B2(T3, T4 and T8) expanded at apex, B1(T9) and B2(T5–T7 and T9) sharply pointed; tube almost straight-sided, 0·51 times as long as head, surface smooth; anal setae longer than tube.

MATERIAL EXAMINED

India: holotype ♀, Madras, on decaying twig, 9.ii.1967 (*T. N. Ananthakrishnan*) (TNA).

India: ♀, Aryankavu, on dry twig, 16.xi.1969 (*T. N. Ananthakrishnan*) (BMNH); 1 ♀, Tirupathi, on dry twig, 4.iii.1979 (*T. N. Ananthakrishnan*) (SO).

COMMENTS. The cheeks of the females listed above, including the holotype, are almost straight and subparallel. However, these specimens are more or less crushed by the cover-slips, therefore the shape is rather transformed, and it is probable that the cheeks are naturally slightly emarginate and gradually narrowed posteriorly. According to Ananthakrishnan (1973), the large male has a forefemoral median hump which is related to the allometric growth.

Holothrips cupreus sp. n.

(Figs 162, 163, 172)

FEMALE (MACROPTERA). Colour brown to dark brown; head and tube a little darker than pterothorax, but tube with pale apex; all tibiae and tarsi whitish yellow; A3 yellow with apex slightly shaded, the rest of antennae brown to dark brown, almost concolorous with head; wings shaded with pale brown, major setae hyaline.

Head (Fig. 162) 1·18 times as long as broad, dorsal surface not strongly elevated, sculptured postero-laterally; cheeks weakly rounded, gradually narrowed towards base; POS expanded at apex, somewhat

longer than eye. Eyes shorter than 0·3 times as long as head. Antennae about 1·8 times as long as head; A7 with a reduced suture between MA7 and MA8. Mouth-cone long and pointed. Pronotum 1·64–1·70 as broad as long, weakly sculptured posteriorly; all major setae expanded at apex, AM shorter than AA. Forewings each with 11–14 DC; SWS expanded at apex. Pelta (Fig. 172) bell-shaped, a little wider than long, sculptured weakly, with a pair of micro-pores. B1(T2–T7) and B2(T3–T5 and T8) expanded at apex, B1(T9) and B2(T6, T7 and T9) sharply pointed at apex. Tube (Fig. 163) almost straight-sided, surface smooth, about 0·7 times as long as head, 2·4–2·5 times as long as basal width. Anal setae almost as long as tube or a little shorter.

Measurements of holotype female in μm. Total L 3650 (distended). Head L 362, W 306; eye L 97, W 81–82. Pronotum L 245, W 402; forewing L 1440. Pelta L 148, W 158. Tube L 258, basal W 105, apical W 45. A1 to A7 L(W): 66(62); 71(40); 107(51); 107(48); 92(41); 81(40); 90(33).

Length of setae: POS 108–113. Prothoracic AA 61–64, AM 40–50, ML 87–90, PA 97–100, EPIM 87–90. SWS1 61–64, SWS2 71–76, SWS3 83. B1(T9) 263–268, B2(T9) 295–300. Anals 240–250.

MALE. Unknown.

Holotype ♀ (mac.), **Philippines**: Mindanao, Mt Apo, *c.* 1300 m, on dead leaves of ever-green trees, 30.vii.1979 (*S. Okajima*) (BMNH).

Paratype. **Philippines**: 1 ♀, Mindanao, data very similar to holotype, but 3.viii.1979 (SO).

Non-paratypic material. **Philippines**: 1 ♀, Mindanao, North Cotabato, Ilomavis, on dead leaves, 28.vii.1979 (*S. Okajima*) (SO).

COMMENTS. This species is most similar to *castanicolor* from West Malaysia, but can be distinguished by the following features: A3 yellow, with apex slightly shaded with brown, much paler than brown A4; foretibiae whitish yellow; B2(T4 and T5) expanded at apex; tube almost straight-sided, about 0·7 times as long as head.

The non-paratypic female listed above has somewhat pale first and second antennal segments and expanded B2 setae on the sixth tergite.

Holothrips curvidens sp. n.

(Figs 58–61)

FEMALE (MACROPTERA). Colour brown; head and prothorax dark brown; mesothorax brown, somewhat paler than prothorax; metathorax pale brown; abdomen brown, gradually darkened towards apex, distal segments almost concolorous with prothorax; tube dark brown, concolorous with head; all femora brown, a little paler than head, with bases and apices yellowish, foretibiae yellow, mid and hindtibiae whitish yellow; A1 to A3 yellowish, distinctly paler than head, inner margin of A1 and apex of A3 shaded with brown, A4 to A7 brown to dark brown, darkened distally; wings shaded with pale brown, major setae yellowish.

Head (Fig. 58) 1·25 times as long as broad, dorsal surface not elevated, weakly sculptured; cheeks weakly rounded; POS expanded at apex, a little longer than eye. Eyes about 0·25 times as long as head. Antennae 2·24 times as long as head; A6 almost as long as A5 or a little longer; A7 (Fig. 60) with an incomplete suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum 1·57 times as broad as long, weakly sculptured marginally, with a strong median line; major setae expanded at apex, but AM minute and usually pointed, much shorter than AA. Forewings each with 10 DC; SWS expanded at apex. Forefemora enlarged, foretarsal tooth weakly curved inwards. Pelta (Fig. 61) irregularly bell-shaped, much broader than long, sculptured weakly, micro-pores absent. B1(T2–T6 and T8) expanded at apex, B2(T3–T6) weakly expanded, B1(T7 and T9) and B2(T7–T9) pointed at apex. Anterior pair of WRS on T2 to T6 short, straight or simply curved, but a pair on T7 usually absent. Tube (Fig. 59) 0·74 times as long as head, 2·45 times as long as basal width, almost parallel-sided, distinctly constricted apically, dorsal surface smooth, ventral surface weakly sculptured with transverse rows of striae. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L 2550 (distended). Head L 275, W 219; eye L 72·5, W 62–65. Pronotum L 199, W 312; forewing L 975. Pelta L 100, W 147. Tube L 204, basal W 83, apical W 44. A1 to A7 L(W): 66(56); 71(41); 97(50); 98(49); 89(41); 92(41); 97(36).

Length of setae: POS about 90. Prothoracic AA about 50, AM 20–30, ML 52–54, PA 67–70, EPIM 70–72. SWS1 36–40, SWS2 50–52, SWS3 66–68. B1(T9) 224–226, B2(T9) 240–242. Anals 178–183.

MALE. Unknown.

Holotype ♀ (mac.), **Brunei**: Bukit Sulang, nr Lamunin, fogging (*Shorea jahovensis*), 20.viii.–10.ix.1982 (*N. Stork*) (BMNH).

Paratypes. **Brunei**: 3 ♀, same data as holotype (BMNH).

COMMENTS. This species is similar to *ruidus* from India, but differs in the following features: colour uniformly brown; A7 with an incomplete suture between MA7 and MA8; tube subparallel, but distinctly constricted apically; B1(T7) sharply pointed.

Holothrips falcatus sp. n.

(Figs 174–177)

FEMALE (MACROPTERA). Colour brown to dark brown; head and prothorax dark brown; meso- and metathorax brown, much paler than prothorax; abdomen brown, weakly darkened towards apex; tube brown, somewhat yellowish; forefemora dark brown, mid and hindfemora slightly paler than forefemora, with pale extreme apices; foretibiae brownish, foretarsi yellowish; mid and hindtibiae whitish yellow; A1 to A3 yellow, A3 with brownish extreme apex, A4 to A7 yellowish brown to dark brown, gradually darkened distally; wings shaded with pale brown, major setae yellowish.

Head (Fig. 174) 1·16 times as long as broad, dorsal surface not strongly elevated, finely sculptured posteriorly; cheeks gradually narrowed from a level just behind eyes to basal third of head; POS well developed, longer than one-third length of head, weakly expanded at apex; one pair of anteocellar setae well developed, longer than postocellar setae. Eyes comparatively small, about 0·25 times as long as head. Antennae about 1·8 times as long as head; A7 (Fig. 177) with an incomplete suture between MA7 and MA8. Mouth-cone long and pointed. Pronotum about 1·5 times as broad as long, surface almost smooth, with a long median line; major setae expanded at apex, AA and AM well developed. Forewings each with 21–23 DC; SWS expanded at apex. Foretarsal tooth stout, falciform. Pelta (Fig. 176) bell-shaped, with a pair of micro-pores. B1(T2–T8) and B2(T3–T5 and T8) expanded at apex, B1(T9) and B2(T6) blunt or nearly pointed, sometimes weakly expanded, B2(T7 and T9) sharply pointed. Tube (Fig. 175) almost straight-sided, somewhat narrowed near apex, about 0·8 times as long as head, longer than 3·0 times as long as basal width, surface almost smooth. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L about 4100 (distended). Head L 444, W 383; eye L 113–117. Pronotum L 357, W 535; forewing L 1750. Pelta L 173, W 188. Tube L 352, basal W 106, apical W 55. A1 to A7 L(W): 96(76); 96(50); 138(61); 138(60); 117(51); 97(45); 107(37).

Length of setae: POS 155–165. Prothoracic AA 108–112, AM 92–100, ML 128–133, PA 102–108, EPIM 80–90. SWS1 82–86, SWS2 97–102, SWS3 108–118. B1(T9) 296–306, B2(T9) 326–330. Anals 270–280.

MALE (MACROPTERA). Colour and structure very similar to female. Tube 0·75 times as long as head, 2·6 times as long as basal width; sternal reticulated area absent.

Measurements of paratype male in μm. Total L 3270 (distended). Head L 383, W 327+ eye L 95–97, W 72–77. Pronotum L 321, W 466; forewing L 1470. Pelta L 148, W 169. Tube L 286, basal W 109, apical W 48. A1 to A7 L(W): 81(68); 88(44); 112(48); 107(51); 97(42); 87(41); 97(33).

Length of setae: POS 150–155. Prothoracic AA 132–138, AM 102–108, ML 122–132, PA 100–105, EPIM 100–115. SWS1 72–76, SWS2 87–92, SWS3 118. B1(T9) 245–255, B2(T9) 81–91. Anals about 220.

Holotype ♀ (mac.), **Sulawesi**: nr Rantepao, Pedamaran, on dead twigs with leaves, 10.viii.1984 (*S. Okajima*) (BMNH).

Paratypes. **Sulawesi**: 4 ♀, 1 ♂, same data as holotype (SO; 1 ♀, 1 ♂, BMNH).

COMMENTS. This species is closely related to another new species described below under the name of *moundi* from West Malaysia. The differences between them are discussed under the latter species.

Holothrips flavicornis sp. n.

(Figs 156, 157, 170)

FEMALE (MACROPTERA). Colour brown to dark brown; pterothorax and anterior portion of abdomen somewhat paler; foretibiae yellow, shaded with brown basally; mid and hindtibiae whitish yellow; tube dark brown; A1 and A2 yellowish brown, A3 to A5 yellow, apical portion of A5 shaded with pale brown,

A6 yellow at basal half, brown to dark brown at apical half, A7 dark brown; wings weakly shaded, nearly colourless; major setae yellowish.

Head 1·25 (Fig. 156) times as long as broad, dorsal surface weakly sculptured postero-laterally, not strongly elevated; cheeks straight or very weakly rounded, subparallel; POS almost as long as eye, or a little longer, expanded at apex. Eyes shorter than 0·3 times as long as head. Posterior ocelli well separated from eyes. Antennae short, 1·63 times as long as head; A7 with a reduced suture between MA7 and MA8. Mouth-cone pointed. Pronotum about 1·6 times as broad as long, weakly sculptured posteriorly; major setae expanded at apex. Forewings each with 11–13 DC; SWS expanded at apex. Foretarsal tooth well developed, comparatively pointed. Pelta (Fig. 170) longer than broad, weakly sculptured, with a pair of micro-pores. B1(T2–T8) and B2(T3–T6 and T8) expanded at apex, B1(T9) and B2(T7 and T9) sharply pointed. Tube (Fig. 157) distinctly narrowed at basal third and apex, 0·74 times as long as head, about 2·5 times as long as basal width, surface smooth. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L 3180 (distended). Head L 331, W 265; eye L 89, W 71–81. Pronotum L 230, W 367; forewing L 1187. Pelta L 132, W 117. Tube L 245, basal W 97, apical W 41. A1 to A7 L(W): 61(56); 69(40); 100(51); 92(48); 77(42); 74(38); 87(31).

Length of setae: POS 92. Prothoracic AA 41–46, AM 36–40, ML 56–58, PA 72–76, EPIM 72–77. SWS1 46–48, SWS2 51–56, SWS3 58–61. B1(T9) 214–218, B2(T9) 236–240. Anals 190–194.

MALE. Unknown.

Holotype ♀ (mac.), **Singapore**: Bukit Timah, on dead wood (? *Cryptoronia*), 1.xi.1973 (*L. A. Mound*) (BMNH).

COMMENTS. This species can be distinguished from all the other members of the genus by a combination of the following features: A3 and A4 largely yellow; foretarsal tooth comparatively long and pointed; B2(T7 and T9) sharply pointed, B2(T3–T6 and T8) expanded at apex; anal setae shorter than tube.

Holothrips flavitubus sp. n.

(Figs 148–150, 168)

FEMALE (MACROPTERA). Colour dark brown; metathorax and anterior portion of abdomen a little paler; tube clear yellow in basal two-thirds, dark brown in apical one-third; A1 to A3 brown, A4 to A7 brown to dark brown, darkened towards apex; all femora dark brown, mid and hindfemora with pale extreme apices; foretibiae dark brown, mid and hindtibiae whitish yellow; wings shaded with pale brown; major setae yellowish.

Head (Fig. 148) about 1·1 times as long as broad, dorsal surface sculptured, weakly elevated; cheeks weakly rounded, gradually narrowed towards base, widest across a level of posterior margin of eyes; POS about one-third length of head, expanded at apex. Eyes a little shorter than POS. Antennae about 2·1 times as long as head; A7 (Fig. 150) with a reduced suture between MA7 and MA8. Mouth-cone long and pointed. Pronotum about 1·7 times as broad as long, without fine sculpture; all major setae expanded at apex, AM very slender. Forewings each with 17–18 DC; SWS expanded at apex. Pelta (Fig. 168) bell-shaped, but weakly developed, with a pair of micro-pores. T2 with a pair of accessory WRS situated before the regular pairs; anterior pair of WRS on T7 reduced. B1(T2–T8) and B2(T3 and T8) expanded at apex, B1(T9) and B2(T4–T7 and T9) sharply pointed. Tube (Fig. 149) very weakly constricted at basal fourth and near apex, 0·84 times as long as head, 2·76 times as long as basal width, surface very weakly sculptured. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L about 3800 (distended). Head L 346, W 316; eye L 102–103, W 87–89. Pronotum L 239, W 408; forewing L 1654. Tube L 290, basal W 105, apical W 51. A1 to A7 L(W): 74(69); 92(43); 122(51); 127(52); 102(46); 92(41); 92(36).

Length of setae: POS 110–120. Prothoracic AA 72–76, AM 62–74, ML 117, PA 118–122, EPIM 108–112. SWS1 66, SWS2 77–81, SWS3 92–97. B1(T9) 290–300, B2(T9) 318–321. Anals 265–270.

MALE. Unknown.

Holotype ♀ (mac.), **Java**: Tjibodas Gardens, on dead twigs, 23.x.1973 (*L. A. Mound*) (BMNH).

COMMENTS. In the colour of the tibiae and tube, this species is distinct from all the other members of the genus.

There is a specimen very similar to this species in the author's collection. It is a male from Sabah, Borneo, and has a paler third and fourth antennal segments. Moreover, it does not have the accessory

wing-retaining setae on the second tergite, and has a fore pair of wing-retaining setae on the seventh tergite which are not reduced.

Holothrips flavus sp. n.

(Figs 37–40)

FEMALE (MACROPTERA). Colour yellow; A7 mesothorax, mid and hindfemora tinged with pale brown; tube orange yellow, paler basally and apically, with dark extreme apex; forewings shaded with grey; major setae yellowish, anal setae somewhat darker.

Head (Fig. 37) 1·13–1·14 times as long as broad, dorsal surface very weakly sculptured laterally, not strongly elevated; cheeks weakly rounded, slightly constricted at base; POS well developed, longer than eye, blunt at apex. Eyes 0·36–0·38 times as long as head. Posterior ocelli in contact with eyes. Antennae very slender, 2·55–2·60 times as long as head; A3 (Fig. 40) longer than 3·0 times as long as broad; A7 with a reduced suture between MA7 and MA8. Mouth-cone short and rounded; maxillary stylets 10–17 μm apart from each other, reaching a level of POS, but not reaching eyes, with weak and narrow maxillary bridge. Pronotum 1·84–1·94 times as broad as long, weakly sculptured posteriorly; major setae weakly expanded at apex, AA longer than AM, ML and EPIM subequal in length, PA longer than EPIM. Forewings each with 16–20 DC; SWS weakly expanded at apex. Foretarsal tooth short and blunt, directed forwards. Pelta weak, bell-shaped, about 0·8 times as long as broad, micro-pores absent. B1(T2–T8) and B2(T3–T8) weakly expanded or blunt at apex, B1(T9) and B2(T9) sharply pointed. Tube (Fig. 38) 1·17–1·20 times as long as head, about 3·3 times as long as basal width, very slightly constricted apically, without strong reticulation. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L about 3300 (distended). Head L 311, W 275; eye L 112, W 87. Pronotum L 199, W 367; forewing L 1530. Pelta L 138, W 173. Tube L 377, basal W 113, apical W 61. A1 to A7 L(W): 76·5(66); 81(41); 148(46); 143(46); 127(40); 104(33); 128(25·5).

Length of setae: POS 128. Prothoracic AA 86–92, AM 51–62, ML 128–132, PA 148–153, EPIM 128–133. SWS1 72, SWS2 107–112, SWS3 158–168. B1(T9) 301–306, B2(T9) 341–350. Anals 280.

MALE (MACROPTERA). Colour very similar to female, S5 and S6 each with a transverse orange yellow band of reticulated area. Head (Fig. 39) more than 1·2 times as long as broad; pronotum less than 1·5 times as broad as long; forefemora enlarged, with a subbasal hump at inner surface; foretarsal tooth stout; tube 1·05 times as long as head, 3·13 times as long as basal width.

Measurements of paratype male in μm. Total L 3070 (distended). Head L 321, W 260; eye L 112, W 84. Pronotum L 250, W 344; forewing L 1452. Tube L 337, basal W 108, apical W 59. A1 to A7 L(W): 76(66); 81·5(41); 173(46); 153(43); 133(35); 110(31); 128(25·5).

Length of setae: POS 133–143. Prothoracic AA 112–117, AM 26–45, ML 133–138, PA 153–158, EPIM 123–128. SWS1 72, SWS2 117–122, SWS3 194–205. B1(T9) 270–275, B2(T9) 61–65. Anals 286–292.

Holotype ♀ (mac.), **Philippines**: Luzon, nr Lucena City, Quezon National Forest Park, on dead branches, 22.viii.1979 (*S. Okajima*) (BMNH).

Paratypes. **Philippines**: 4 ♀, 2 ♂, Luzon, collected with holotypes (SO; 2 ♀, 1 ♂, BMNH).

COMMENTS. This species belongs to the *apoensis*-group. From the other members of the group, it can be easily distinguished by the following features: colour uniformly yellow; antennae very slender, longer than 2·5 times length of head, A3 longer than 3·0 times as long as broad.

Holothrips formosanus sp. n.

(Figs 184–186, 195)

FEMALE (MACROPTERA). Colour dark brown; A3 yellow, shaded with brown at apical half, A4 and A5 with bases yellow; wings shaded with pale brown; major setae yellowish.

Head (Fig. 184) 1·17 times as long as broad, dorsal surface finely sculptured, not strongly elevated; cheeks weakly rounded, constricted just behind eyes; POS sharply pointed at apex, longer than half length of head. Eyes 0·28–0·29 times as long as head. Antennae about 2·2 times as long as head; A7 (Fig. 186) with a nearly complete suture between MA7 and MA8 (incomplete on dorsal surface). Mouth-cone long and pointed. Pronotum 1·77 times as broad as long, weakly sculptured posteriorly; AM setae minute, pointed at apex, AA and ML blunt, PA and EPIM long and sharply pointed. Forewings each with 35–36 DC; SWS pointed at apex. Pelta (Fig. 195) irregularly bell-shaped, with distinct reticulation, micro-pores absent. All B1 and B2 setae on tergites pointed at apex. Tube (Fig. 185) almost straight-sided, gradually narrowed

towards base, about 0·9 times as long as head, 2·57 times as long as basal width. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L about 5500 (distended). Head L 422; W 362; eye L 118–120, W 92–102. Pronotum L 326, W 576; forewing L 2550. Pelta L 240, W 240. Tube L 378, basal W 147, apical W 65. A1 to A7 L(W): 100(81); 112(56); 150(76); 155(70); 138(57); 113(51); 137(42).

Length of setae: POS 230–240. Prothoracic AA 160–170, AM 35–50, ML 165–170, PA 215–220, EPIM about 250. SWS1 117–127, SWS2 183–195, SWS3 300–315. B1(T9) 360–365, B2(T9) 400–410. Anals 380–400.

MALE (MACROPTERA). Colour as in female. Head 1·17–1·25 times as long as broad; pronotum 1·46–1·80 times as broad as long, AA and ML nearly pointed at apex; forefemora enlarged, foretarsal tooth stout; forewings each with 26–40 DC; sternal reticulated areas present on S4 to S7, but very weakly developed, absent on S4 in small male; tube 0·79–0·80 times as long as head, 2·35–2·50 times as long as basal width.

Measurements of paratype large (small) male in μm. Total L 4700 (3850) (distended). Head L 408 (346), W 326 (296); eye L 115–117 (100–102), W 91–93 (82–86). Pronotum L 388 (260), W 566 (469); forewing L 2522 (2010). Pelta L 219 (184), W 204 (184). Tube L 326 (275), basal W 130 (117), apical W 63 (55). A1 to A7 L/W: 97(82)/80(69); 107(97)/53(46); 158(135)/67(56); 168(138)/63(54); 143(123)/50(47); 112(102)/45(43); 138(118)/38(37).

Length of setae: POS 220–230 (200–220). Prothoracic AA 125–135 (110–120), AM 45–50 (30–35), ML 200–230, PA about 250 (about 200), EPIM 255–260 (220–240). SWS1 110 (95–97), SWS2 173–200 (150–155), SWS3 280–300 (220–250). B1(T9) 350–380 (330–360), B2(T9) 122–123 (100–105). Anals 360–385 (310–330).

Holotype ♀ (mac.), **Taiwan**: Nantou Hsien, Meifeng, *c.* 2000 m, 5.iv.1977 (*W. Suzuki*) (BMNH).

Paratypes. **Taiwan**: 3 ♂, Nantou Hsien, Tsuifeng (nr Meifeng), on dead branches, 1.v.1983 (*M. Hasegawa*) (SO; 1 ♂, BMNH).

COMMENTS. This species is somewhat similar to *fumidus*, but it can be distinguished from the latter by the following features: POS pointed at apex, longer than half the length of head; prothoracic ML, PA and EPIM longer, pointed at apex; tube almost straight-sided; anal setae a little longer than tube. Moreover, the peltae of these two species are different in shape from each other.

Holothrips fumidus (Ananthakrishnan)

(Figs 202–204)

Polyphemothrips fumidus Ananthakrishnan, 1972: 429–430. Holotype ♀, INDIA (TNA) [examined].
Holothrips fumidus (Ananthakrishnan) Mound & Palmer, 1983: 94.

FEMALE (MACROPTERA). Colour brown to dark brown; legs and tube concolorous with body; A3 a little paler than the remaining segments. Head (Fig. 202) 1·15 times as long as broad, dorsal surface sculptured posteriorly; cheeks weakly rounded; POS blunt at apex, a little longer than eye. Eyes about 0·3 times as long as head. Mouth-cone long and pointed. SWS2 much shorter than SWS3; forewings each with 21–28 DC. Prothoracic AM minute, shorter than AA. Pelta (Fig. 204) slender, 1·52–1·56 as long as broad, micro-pores absent. All B1 and B2 setae on tergites pointed at apex, sometimes these setae on T2 and T3 blunt. Tube (Fig. 203) constricted apically, 0·82–0·84 times as long as head, surface almost smooth.

MALE (MACROPTERA). Colour and structure almost as in female except for the following: fore legs stouter, somewhat paler than body; sternal reticulated areas present on S4 to S6, but weakly developed; tube distinctly constricted at basal fourth, 0·84–0·87 times as long as head.

Measurements of male (from Nepal) in μm. Total L about 3800 (distended). Head L 393, W 311; eye L 117. Pronotum L 316, W 490; forewing L 1876. Pelta L 178, W 153. Tube L 337, basal W 135, apical W 56. A1 to A7 L(W): 82(77); 92(47); 143(61); 158(61); 128(51); 102(439); 115(37).

Length of setae: POS 143–153. Prothoracic AA 86–92, AM 35, ML 122–128, PA 122–128, EPIM 130–155. SWS1 81–87, SWS2 102–110, SWS3 153–163. B1(T9) 365–375, B2(T9) 117–122. Anals about 300.

MATERIAL EXAMINED

India: holotype ♀, Muktheswar, on dry twigs, 19.x.1970 (*T. N. Ananthakrishnan*) (TNA).
India: 1 ♂, Darjeeling, Tiger Hill, 15.viii.1981 (*W. Suzuki*) (SO); 1 ♀, Darjeeling, Lopchu, 31.v.1975

(*W. Wittmer*) (SMF). **Nepal**: 1 ♀, 2 ♂, Kathmandu Valley, Godavari, 11.vi.1981 (*W. Suzuki*); 1 ♀, Syabru, nr Langtang Valley, 4.vii.1981 (*W. Suzuki*) (SO; 1 ♀, 1 ♂, BMNH).

COMMENTS. There are seven females from Taiwan and Thailand in the author's collection which may be related to this species. These females are different from *fumidus* in not having pointed major setae (B1 and B2) on most of the intermediate abdominal tergites, and in having somewhat heavy tubes which are sculptured weakly with polygonal reticulations. This material may be conspecific, or may include two or more species. The data of these females are as follows. **Taiwan**: 2 ♀, Nantou Hsien, Nanshanchi, on dead branches, 25.iii.1984 (*S. Okajima*); 3 ♀, Nantou Hsien, Meifeng, *c.* 2000 m, on dead branches, 28.iii.1984 (*S. Okajima*). **Thailand**: 1 ♀, Doi Suthep, nr Chiang Mai, on dead leaves, 7.viii.1976 (*S. Okajima*), 1 ♀, 22.v.1979 (*W. Suzuki*).

Holothrips hagai sp. n.

(Figs 192, 193, 198, 199)

FEMALE (MACROPTERA). Colour dark brown; abdomen gradually darkened towards apex; basal half of tube sometimes pale; A3 somewhat pale at base; legs dark brown; wings shaded with pale brown; major setae yellowish.

Head (Fig. 192) 1·05–1·08 times as long as head, dorsal surface not strongly elevated, sculptured postero-laterally; cheeks weakly rounded; POS longer than eye, blunt at apex. Eyes 0·29–0·30 times as long as head. Antennae 1·86 times as long as head; A3 and A4 subequal in length; A7 (Fig. 199) with a nearly complete suture between MA7 and MA8. Mouth-cone long and pointed. Pronotum 2·15 times as broad as long, major setae blunt at apex, AM shorter than AA. Forewings each with about 20 DC; SWS blunt at apex, but SWS2 and SWS3 sometimes nearly pointed. Foretarsal tooth usually directed inwards. Pelta (Fig. 198) bell-shaped, anterior margin not rounded, rather straight, micro-pores absent. B1(T8) and B2(T8) blunt at apex, all other B1 and B2 setae on tergites sharply pointed, sometimes blunt, but nearly pointed. Tube (Fig. 193) somewhat heavy, constricted at basal third and apex, 0·72–0·74 times as long as head, about 2·3 times as long as basal width, surface sculptured with weak polygonal reticulation. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L 4050 (distended). Head L 413, W 385; eye L 120–122, W 97–102. Pronotum L 490, W 228; forewing L 1738. Pelta L 178, W 178. Tube L 301, basal W 130, apical W 61. A1 to A7 L(W): 77(72); 92(48); 179(58); 179(57); 107(51); 92(46); 117(41).

Length of setae: POS 158–163. Prothoracic AA 87–97, AM 66–72, ML 105–110, PA 107–112, EPIM about 155. SWS1 82, SWS2 114–116, SWS3 160–170. B1(T9) 255–270, B2(T9) 230–250. Anals 235–245.

MALE (MACROPTERA). Colour very similar to female. Head 1·04–1·08 times as long as broad; POS and prothoracic major setae sometimes pointed at apex; sternal reticulated areas present on S4 to S7, but weak, sometimes absent on S4; tube heavier, distinctly constricted at basal third, slightly constricted at apex, 0·71–0·72 times as long as head, 1·92–2·04 times as long as basal width.

Measurements of paratype male in μm. Total L 3250 (distended). Head L 341, W 316; eye L 92–96, W 78–82. Pronotum L 210, W 407; forewing L about 1400. Pelta L 138, W 152. Tube L 244, basal W 127, apical W 52. A1 to A7 L(W): 66(66); 92(41); 108(54); 108(51); 87(46); 82(43); 102(36).

Length of setae: POS 100–104. Prothoracic AA 55–63, AM 50–53, ML 75–85, PA 80–85, EPIM 100–105. SWS1 64–67, SWS2 82–86, SWS3 112–120. B1(T9) 212–215, B2(T9) 92–97. Anals 190–200.

Holotype ♀ (mac.), **Japan**: Izu Is, Mikura I., Kawada, on dead leaves and branches, 4.vi.1983 (*M. Hasegawa*) (SO).

Paratypes. **Japan**: 1 ♀, 1 ♂, Izu Is, Mikura I., collected with holotype, 8 ♀, 1 ♂, 7.vi.1983, 1 ♀, Kurosakitakao, 5.vi.1983 (*M. Hasegawa*); 3 ♀, 2 ♂, Izu Is, Miyake I., nr Tairo-Ike, on dead branches, 26.x.1985 (*S. Okajima*) (SO; 5 ♀, 2 ♂, BMNH).

Non-paratypic material. **Japan**: many females and males from the following localities – Hiroshima, Hyogo, Nara, Nagano, Kanagawa, Yamanashi (Honshu), Amami-Ohshima I., Okinawa I., Ishigaki I., Iriomote I. (Ryukyus) (SO; BMNH).

COMMENTS. This species is very similar to another sympatric species, *yuasai*, but it can be distinguished from the latter by the following features: antennae almost uniformly dark brown; anterior margin of pelta not rounded, rather straight; B1 and B2 setae on T9 pointed; tube heavier, distinctly constricted at basal third and apex.

The specimens from the Ryukyus have the tubes longer and not distinctly constricted at basal third. However, those from Honshu have the tubes intermediate in length and shape between the specimens from

the Ryukyus and the type-specimens from Izu Is. These specimens suggest that *hagai* exists as a cline between local populations in Japan.

Holothrips hasegawai sp. n.

(Figs 201, 205–207)

Female (macroptera). Colour brown to dark brown; metathorax and anterior portion of abdomen somewhat paler, abdomen gradually darkened towards apex; A3 pale at basal third; wings shaded with pale brown; major setae yellowish.

Head (Fig. 205) about 1·2 times as long as broad, dorsal surface not strongly elevated, sculptured weakly; cheeks very weakly rounded or almost straight; POS about one-third length of head, blunt at apex. Eyes rather small, 0·25–0·26 times as long as head. Antennae 1·72 times as long as head; A4 a little shorter than A3; suture between MA7 and MA8 incomplete (Fig. 201), but nearly complete. Mouth-cone long and pointed. Pronotum about 2·0 times as broad as long, sculptured posteriorly; major setae blunt at apex. Forewings each with 19–22 DC; SWS1 weakly expanded, SWS2 and SWS3 blunt at apex. Foretarsal tooth small, directed forwards. Pelta (Fig. 207) much longer than broad, rather trapezoid, sculptured weakly, micro-pores absent. B1(T2–T4) and B2(T3 and T4) blunt or nearly pointed at apex, B1(T5–T7 and T9) and B2(T5–T7 and T9) sharply pointed, B1(T8) and B2(T8) blunt. Tube (Fig. 206) very weakly constricted at basal third, 0·77 times as long as head, 2·74 times as long as basal width, surface weakly sculptured with polygonal reticulation. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L 4130 (distended). Head L 444, W 372; eye L 112–117, W 102–107. Pronotum L 240, W 484; forewing L 1700. Pelta L 184, W 135. Tube L 342, basal W 125, apical W 54. A1 to A7 L(W): 77(77); 100(48); 138(60); 128(61); 112(55); 92(45); 107(40).

Length of setae: POS 147–150. Prothoracic AA 92, AM 72–82, ML about 110, PA 122–138, EPIM 153–163. SWS1 86–97, SWS2 92–97, SWS3 163–168. B1(T9) about 320, B2(T9) 296–306. Anals about 260.

Male. Unknown.

Holotype ♀ (mac.), **Japan**: Ogasawara Is, Haha-jima I., on dead branches, 18.v.1984 (*M. Hasegawa*) (SO).

Paratypes. **Japan**: 4 ♀, collected with holotype (SO; 2 ♀, BMNH).

Comments. This species is distinct from all the other members of the genus by a combination of the following features: cheeks more or less projecting laterally just behind eyes; all tibiae dark brown; pelta without micro-pores; mouth-cone long and pointed; tube weakly sculptured with polygonal reticulation; eyes rather small, less than 0·3 times as long as head.

Holothrips indicus (Ananthakrishnan)

Agnostothrips (Erythrinothrips) indicus Ananthakrishnan, 1956: 341–342. Holotype ♀, India (TNA) [not examined].
Symphothrips associatus Ananthakrishnan, 1968: 56–57. Holotype ♀, India (TNA) [not examined].
Holothrips indicus (Ananthakrishnan) Mound & Palmer, 1983: 94.

The coloration is variable in this species as follows: head yellow at base, darkened with brown anteriorly, pterothorax brown, prothorax and abdomen yellow (quoted from the original description of *indicus*); whole body yellow; head yellow, darkened at anterior third, prothorax and mesothorax brown, metathorax and abdomen yellow.

Female (macroptera). Head a little longer than broad; A7 with a complete suture between MA7 and MA8; POS, prothoracic major setae, SWS, B1(T2–T8) and B2(T3–T6 and T8) expanded at apex, B1(T9) and B2(T7 and T9) sharply pointed; pelta bell-shaped, with a pair of micro-pores; tube straight-sided, 0·58 times as long as head, 2·1–2·2 times as long as basal width, surface smooth; anal setae almost as long as tube.

Material examined

India: 1 ♂, Kumili, on dry twig, 2.viii.1969 (*T. N. Ananthakrishnan*) (BMNH); 1 ♀, Jupal, on dry twig, 17.xii.1969 (*T. N. Ananthakrishnan*) (BMNH); 1 ♀, Kerala, Kudal, on dry twigs and leaves, 6.x.1969 (*T. N. Ananthakrishnan*) (BMNH); 1 ♂, Anamalai Hills, 6.ii.1971 (*T. N. Ananthakrishnan*) (TNA).

COMMENTS. This species is most similar to *andamanensis*, and the differences between them are discussed under the latter species.

Holothrips japonicus sp. n.

(Figs 100, 101, 104–106)

FEMALE (MACROPTERA). Colour uniformly dark brown; extreme base of A3 yellowish; major setae yellowish, wings shaded with pale brown.

Head (Fig. 100) 1·30–1·32 times as long as broad, slightly elevated dorsally, sculptured at posterior half; cheeks almost straight, gradually narrowed towards base; POS blunt at apex, 0·30–0·34 times as long as head. Eyes 2·60–2·65 times as long as head. Antennae 2·0–2·1 times as long as head; A7 (Fig. 106) 3·5–3·6 times as long as broad, with a complete suture between MA7 and MA8. Mouth-cone short and not pointed. Pronotum 2·1–2·3 times as broad as long, sculptured posteriorly, with a strong median line; major setae blunt at apex; inner side of probasisternum pointed (Fig. 105). Foretarsal tooth short, wide-based, directed forwards. Forewings each with 23–25 DC; SWS blunt at apex, but SWS3 sometimes nearly pointed. Pelta (Fig. 104) bell-shaped, tinged with dark brown at portion except for posterior area, micro-pores absent. B1(T2–T8) and B2(T3–T5 and T8) blunt at apex, B2(T6 and T7) nearly pointed, B1(T9) and B2(T9) sharply pointed. Tube (Fig. 101) almost straight-sided, gradually narrowed towards apex, 0·63 times as long as head, about 2·0 times as long as basal width, surface smooth. Anal setae almost as long as tube or a little shorter.

Measurements of holotype female in μm. Total L about 4600 (distended). Head L 500, W 377; eye L 133, W 102–108. Pronotum L 224, W 515; forewing L 1860. Pelta L 209, W 306. Tube L 316, basal W 153, apical W 66·5. A1 to A7 L(W): 108(90); 100(52); 178(66); 173(66); 153(58); 128(51); 143(40).

Length of setae: POS 153–168. Prothoracic AA about 130, AM 97–102, ML 140–150, PA 184–188, EPIM about 170. SWS1 110–112, SWS2 170–173, SWS3 178–204. B1(T9) 280–300, B2(T9) 316. Anals 306–310.

MALE (MACROPTERA). Colour very similar to female. POS longer, 0·38–0·40 times as long as head; pronotum well developed, forefemora enlarged, foretarsal tooth stout, directed inwards; pelta generally tinged with dark brown; abdominal reticulated areas present in S4 to S7; tube 0·67 times as long as head, about 1·9 times as long as basal width, weakly sculptured on ventral surface.

Measurements of paratype male in μm. Total L about 3900 (distended). Head L 413, W 313; eye L 111, W 81–84. Pronotum L 220, W 500; forewing L 1720. Pelta L 178, W 280. Tube L 275, basal W 145, apical W 59. A1 to A7 L(W): 97(73); 87(48); 158(56); 148(61); 128(52); 112(46); 137(36).

Length of setae: POS 158–163. Prothoracic AA about 100, AM 56–92, ML 158–168, PA 193–205, EPIM 76–78. SWS1 102–112, SWS2 173–179, SWS3 184–220. B1(T9) 280, B2(T9) 76–78. Anals 280.

Holotype ♀ (mac.), **Japan**: Niigata Pref., Itoigawa-shi, Hiraiwa, on dead branches, 10.x.1982 (*M. Hasegawa*) (SO).

Paratypes. **Japan**: 7 ♀, 1 ♂, collected with holotype (SO; 3 ♀, BMNH).

COMMENTS. The appearance of this species is somewhat similar to *minor* (Hood) from South America. However, the ocellar region of *minor* is strongly convex, although this is not so in *japonicus*. Another Japanese species, *latidentis*, newly described below is very similar to this species, and the differences between them are discussed under *latidentis*.

Holothrips kuntiae (Sen) comb. n.

Polyphemothrips kuntiae Sen, 1982: 512–514. Holotype ♀, INDIA (Zoological Survey of India) [examined].

FEMALE (MACROPTERA). Colour yellow partly shaded with grey; all femora and abdominal segment IX shaded with grey; A1 shaded with grey, A2 and A3 yellow, A4 yellow at basal three-fourths and dark greyish brown distally, A5 to A7 dark greyish brown, A5 and A6 with pale bases; tube greyish brown, with pale base.

MATERIAL EXAMINED

India: holotype ♀, Kerala, Silent Valley, on dry twigs, 18.i.1980 (*N. Muraleedharan*) (Zoological Survey of India).

COMMENTS. This species has corrugated cheeks, inwardly curved foretarsal tooth, comparatively enlarged forefemora and well-developed prothorax. These features are very similar to those of *ruidus* and its

relatives. However, this species differs from them in the seventh antennal segment which has a nearly complete suture between the seventh and eighth morphological antennal segments, and in the straight-sided tube.

Holothrips latidentis sp. n.

(Figs 102, 103, 107–109)

Female (macroptera). Colour uniformly dark brown; tarsi yellowish; major setae brownish yellow, wings shaded with pale brown.

Head (Fig. 102) 1·25–1·29 times as long as broad, slightly elevated dorsally, not sculptured near median longitudinal line; cheeks almost straight, or very weakly emarginate, gradually narrowed towards base; POS blunt at apex, 0·34–0·38 times as long as head. Eyes 0·24–0·26 times as long as head. Antennae 1·96–2·10 times as long as head; A7 (Fig. 107) 2·7–3·0 times as long as broad, with a complete suture between MA7 and MA8. Mouth-cone short and not pointed. Pronotum 2·13–2·30 times as broad as long, weakly sculptured posteriorly, with a strong median line; all major setae blunt at apex. Foretarsal tooth short, wide-based and directed forwards. Forewings each with 15–20 DC; SWS blunt at apex. Pelta (Fig. 107) rather triangular, sometimes irregularly shaped, micro-pores absent. B1(T2–T8) and B2(T3–T6 and T8) blunt at apex, at least not sharply pointed, B1(T9) and B2(T7 and T9) sharply pointed at apex, but B2(T7) sometimes blunt. Tube (Fig. 103) straight-sided, 0·62–0·63 times as long as head, 2·04 times as long as basal width, surface smooth. Anal setae almost as long as tube or a little shorter.

Measurements of holotype female in μm. Total L about 3800 (distended). Head L 413, W 321; eye L 102–107, W 86–89. Pronotum L 194, W 413; forewing L 1500. Pelta L 168, W 200. Tube L 260, basal W 127, apical W 56. A1 to A7 L(W): 92(77); 87(46); 143(61); 143(57); 122(54); 107(49); 117(40).

Length of setae: POS 142–145. Prothoracic AA 82, AM 66–69, ML 110–115, PA 130–135, EPIM 125–132. SWS1 90–95, SWS2 120–128, SWS3 160–175. B1(T9) 244–252, B2(T9) 244–148. Anals 255.

Male (macroptera). Colour similar to female. Forefemora somewhat enlarged, foretarsal tooth stout, rather triangular in large male; abdominal reticulated areas undeveloped; tube 0·65–0·67 times as long as head.

Measurements of paratype male in μm. Total L about 3200 (distended). Head L 413, W 321; eye L 87–89, W 77–81. Pronotum L 184, W 372; forewing L 1330. Tube L 240, basal W 119, apical W 57. A1 to A7 L(W): 76(67); 82(44); 122(50); 122(51); 112(45); 102(42); 112(35).

Length of setae: POS 135–140. Prothoracic AA about 70, AM 77–80, ML 80–120, PA 132–135, EPIM 115–130. SWS1 92–97, SWS2 102–122, SWS3 117–135. B1(T9) 200–206, B2(T9) 66–70. Anals 240.

Holotype ♀ (mac.), **Japan**: Kanagawa Pref., Miura-hantou, Jinmuji Forest, on dead branches, 30.x.1983 (*S. Okajima*) (SO).

Paratypes. **Japan**: 1 ♀, collected with holotype; 2 ♀, data very similar to holotype, but 6.iii.1983; 1 ♀, Hyogo Pref., nr Kobe, Mt Futatabi, on dead branches, 15.viii.1980 (*S. Okajima*); 2 ♀, Osaka Pref., foot of Mt Ikoma, Hiraoka Park, on dead branches, 29.xii.1983 (*S. Okajima*); 1 ♀, Izu Is, Mikura I., Kurosakita-kao, on dead leaves, 5.vi.1983 (*M. Hasegawa*); 29 ♀, 12 ♂, Izu Is, Miyake I., nr Tairo-ike, on dead branches, 27.x.1985 (*S. Okajima*) (SO; 10 ♀, 5 ♂, BMNH; 1 ♀, 1 ♂, SMF).

Comments. This species resembles *japonicus* in appearance, but it can be distinguished by the following features: body smaller; pelta usually pale; A7 shorter, 2·7–3·0 times as long as broad; inner side of probasisternum rounded, not pointed (Fig. 108). Another new species, *okinawanus*, described below from the Ryukyus is also similar to this species; the differences between them are discussed under *okinawanus*.

Holothrips luteus (Faure)

Polyphemothrips luteus Faure, 1954: 147–152. Holotype ♀, South Africa (South African National Insect Collection, Pretoria) [1 ♂ paratype examined].
Holothrips luteus (Faure) Mound & Palmer, 1983: 94.

Material examined

South Africa: 1 ♂ (paratype), Cape, Somerset West, fallen leaves, 28.ii.1950 (*J. C. Faure*) (BMNH).

Comments. Unfortunately, the present author has not studied the holotype female. However, this species is quite distinct in having expanded mid-vertex (mid-dorsal) head setae and all prominent lateral setae (B1 and B2 setae) on the tergites. However, these features may be in common with *titschacki* (p. 50).

Holothrips luminosus sp. n.

(Figs 115–118)

FEMALE (MACROPTERA). Colour yellow; mesothorax, mid and hindfemora more or less shaded with brown; basal half of tube orange yellow, with pale base, apical half of tube yellowish, with brown extreme apex; A1 and A2 yellow, almost concolorous with head, A3 yellow, a little darker than head, A4 to A6 pale brownish yellow to brownish yellow, A7 brown; wings shaded with pale brown; all major setae yellowish.

Head (Fig. 117) 1·43 times as long as broad, dorsal surface with distinct sculpture, elevated dorsally, broadest across just behind eyes; cheeks weakly emarginate; POS expanded at apex. Eyes shorter than 0·25 times as long as head. Antennae shorter than 2·0 times as long as head; A7 (Fig. 116) with a reduced suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum about 1·8 times as broad as long, surface smooth, only with weak sculpture at near posterior margin; major setae expanded at apex, AA longer than AM. Forewings each with 9 DC; SWS expanded at apex. Pelta bell-shaped, sculptured weakly, sculpture reduced posteriorly, micro-pores absent. B1(T2–T8) and B2(T3–T5 and T8) expanded at apex, B2(T6) weakly expanded at apex, B1(T9) and B2(T7 and T9) long and sharply pointed. Tube (Fig. 118) about 0·6 times as long as head, about 2·4 times as long as basal width, almost straight-sided, smoothly narrowed towards apex, surface without sculpture. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L 2900 (distended). Head L 372, W 260; eye L 90, W 77. Pronotum L 184, W 332; forewing L 1050. Pelta L 112, W 178. Tube L 219, basal W 97, apical W 45. A1 to A7 L(W): 61(58·6); 71(41); 91·5(49); 107(51); 102(49); 92(41); 92(34·6).

Length of setae: POS 102–105. Prothoracic AA 50–60, AM 45–46, ML 77–80, PA 77–82, EPIM 77. SWS1 50–56, SWS2 61–63, SWS3 72–82. B1(T9) 224–228, B2(T9) 234. Anals 200–206.

MALE. Unknown.

Holotype ♀ (mac.), **Philippines**: Luzon, nr Daet, Bicol National Park, on dead branches, 13.viii.1979 (*S. Okajima*) (BMNH).

Non-paratypic material. **Philippines**: 1 ♀, Luzon, nr Lucena City, Quezon National Forest Park, on dead branches, 20.vii.1979 (*S. Okajima*) (SO).

COMMENTS. This species resembles *cracens* and its relatives in appearance, but can be distinguished by the following features: colour uniformly yellow; dorsal surface of head sculptured distinctly; B1(T9) and B2(T7 and T9) sharply pointed, other B1 and B2 setae on tergites expanded at apex; anal setae shorter than tube.

The non-paratypic female listed above may be a large individual of this species. Measurements of it are as follows (μm): total body L 3550 (distended); head L 439, W 326; pronotum L 265, W 469; tube L 265, basal W 117, apical W 51; A1 to A7 L(W) = 82(71), 87(46), 122(56), 142(61), 128(51), 112(45·7), 112(36); POS about 130.

Holothrips maxillae sp. n.

(Figs 43–46)

FEMALE (MACROPTERA). Colour yellowish brown to brown; head and thorax yellowish brown, darkened laterally; abdomen yellowish brown, tube brown at basal two-thirds, yellowish at apical one-third, with dark extreme apex; A1 brown, A2 brown with apex paler, A3 to A6 yellowish, A6 tinged with brown apically, A7 brown with base yellowish; all femora brown, foretibiae yellowish brown, mid and hindtibiae brown with paler bases and apices; forewings each with a longitudinal pale brown stripe; major setae yellowish.

Head (Fig. 44) 1·19–1·25 times as long as broad, dorsal surface sculptured laterally with weak striae, ocellar region smooth; cheeks subparallel, weakly incut just behind eyes, slightly constricted basally; POS much shorter than eye, nearly pointed at apex. Eyes well developed, 0·39–0·42 times as long as head. Posterior ocelli in contact with eyes. Antennae 2·2–2·3 times as long as head; A7 (Fig. 46) with a reduced suture between MA7 and MA8. Mouth-cone short, not pointed; maxillary stylets far apart from each other, short, not reaching a level of POS, with weak maxillary bridge. Pronotum 1·3–1·5 times as broad as long, weakly sculptured laterally and posteriorly; major setae expanded at apex, AM shorter than AA. Forewings each with 20–34 DC; SWS1 and SWS2 weakly expanded at apex, SWS3 blunt. Foretarsal tooth directed forwards. Pelta (Fig. 43) bell-shaped, with weak sculpture, micro-pores absent. B1(T2–T8) and B2(T3–T8) weakly expanded at apex, B1(T9) and B2(T9) very weakly expanded, at least not sharply pointed. Tube (Fig. 45) 1·05–1·09 times as long as head, 2·88–2·90 times as long as basal width, slightly constricted apically, without sculpture. Anal setae shorter than tube.

Measurements of large (small) female in μm. Total L about 4000 (2950) (distended). Head L 352 (280), 280 (235); eye L 138 (117), W 87 (98). Pronotum L 230 (153), W 423 (321); forewing L 1834 (1378). Pelta L 173 (128), W 209 (158). Tube L 382·5 (296), basal W 132·5 (102), apical W 61 (51). A1 to A7 L/W: 81·5(61)/74(57); 82(61)/45(37); 132·5(107)/56(49); 158(117)/56(46); 138(102)/46(41); 107(79)/39(36); 112(92)/28(28).

Length of setae: POS 76–92 (about 50). Prothoracic AA 46–61 (36–41), AM 20–25 (15–20), ML 61–70 (?), PA 102–117 (about 70), EPIM 102–122 (76–80). SWS1 65–71 (45–50), SWS2 80–86 (about 50), SWS3 153–163 (112–117). B1(T9) 255–265 (209–215), B2(T9) 234–245 (178–190). Anals 296–305 (234–250).

MALE (MACROPTERA). Colour very similar to female. Head longer than female, 1·38–1·41 times as long as broad; eyes 0·36–0·37 times as long as head; pronotum 1·51–1·55 times as broad as long; forefemora enlarged, foretarsal tooth stouter; S5 (sometimes S4) to S7 each with a reticulated area, that on S5 most developed; tube 0·86–0·87 times as long as head, 2·60–2·65 times as long as basal width.

Measurements of large (small) male in μm. Total L 3600 (3180) (distended). Head L 357 (321), W 252 (232); eye L 130 (120). Pronotum L 286 (224), W 433 (347). Pelta L 153 (133), W 158 (153). Tube L 306 (281), basal W 117 (106), apical W 59 (56). A1 to A7 L/W: 87(76·5)/71(65); 81(76)/41(38); 148(128)/55(50); 156(143)/51(47); 138(128)/46(41); 107(92)/37(36); 112(102)/26·5(25·5).

Length of setae: POS 86–95 (80–85). Prothoracic AA 56–60 (40–50), AM 40–45 (25–30), ML 66–75 (about 70), PA 128–132 (112–117), EPIM about 130 (about 110). SWS1 60–65 (60–64), SWS2 80–100 (80–85), SWS3 153–160 (158–162). B1(T9) 230–235 (214–220), B2(T9) 80–85 (85). Anals 280 (255).

Holotype ♀ (mac.), **Philippines**: Mindanao, Mt Apo, nr Marber River, 1000–1500 m, on dead leaves, 7.iii.1978 (*N. Kashiwai*) (BMNH).

Paratypes. **Philippines**: 11 ♀, 6 ♂, Mindanao, collected with holotype (SO; 5 ♀, 3 ♂, BMNH).

Non-paratypic material. **Philippines**: 1 ♂, Luzon, nr Lucena City, Quezon National Forest Park, on dead leaves of ever-green tree, 22.viii.1979 (*S. Okajima*) (SO).

COMMENTS. This species resembles *apoensis* in appearance, but it can be distinguished by the following features: maxillary stylets shorter, not reaching level of POS; head longer, more than 1·15 times as long as broad; reticulation on pelta weak; antennal segments paler, whole of A3 and A4 yellow, base of A7 yellowish.

A non-paratypic male from Luzon listed above is exceptionally small. The maxillary stylets of this specimen are somewhat longer than those of paratype males from Mindanao.

Holothrips mirandus (Ananthakrishnan)

(Figs 6, 20, 21)

Polyphemothrips mirandus Ananthakrishnan, 1969*a*: 305. Holotype ♀, INDIA (TNA) [examined].
Holothrips mirandus (Ananthakrishnan) Mound & Palmer, 1983: 94.

FEMALE (MACROPTERA). Colour brown to dark brown, with yellow tibiae; antennal segments brown, but A3 yellowish at basal half. Head (Fig. 20) 1·50–1·65 times as long as broad, dorsal surface weakly sculptured postero-laterally; cheeks almost straight-sided, subparallel; POS long, a little shorter than half the length of head, nearly pointed at apex. A7 with an incomplete suture between MA7 and MA8. Mouth-cone short, not pointed. Pelta (Fig. 21) longer than broad, micro-pores absent. B1(T2–T8) and B2(T3, T4 and T8) blunt at apex, B1(T9) and B2(T5–T7 and T9) sharply pointed at apex. Tube slightly constricted near apex, 0·87–0·90 times as long as head, about 2·9 times as long as basal width.

MALE (MACROPTERA). Colour similar to female. Head 1·56–1·68 times as long as broad; prothoracic major setae well developed in large male, but AM short; forefemora enlarged in large male, foretarsal tooth stout, wide-based and rather triangular; sternal reticulated areas present on S5 to S7 (Fig. 6); tube 0·82–0·90 times as long as head, slightly constricted at basal fourth.

MATERIAL EXAMINED

India: holotype ♀, Kallar 2000′, Nilgiris, on fungus infested twigs, 9.ii.1969 (*T. N. Ananthakrishnan*).

India: 1 ♂ (labelled as allotype), Joopal, Coorg, on dry twigs, 17.xii.1969 (*T. N. Ananthakrishnan*); 1 ♂ (labelled as allotype of *Polyphemothrips enormis* Ananthakrishnan), Dhoni Forest, Plaghat, on dry twigs, 16.xi.1969 (*T. N. Ananthakrishnan*) (TNA). **West Malaysia**: 1 ♀, Tregganu, 2600′, Gn. Lawit, East Ridge, 102° 37′ E, 5° 25′ N, on forest floor (litter), 10.iii.1974 (BMNH); 1 ♀, Kuala Lumpur, on dead palm leaves, 29.xii.1969, 1 ♀, 3 ♂ on dead branches, 26.xii.1969 (*R. G. & F. Andre*) (BMNH); 1 ♀, N. E. 30 km from

Tapah, on dead leaves, 3.iii.1976 (*W. Suzuki*); 2 ♀, Gn. Beremban, v.1981 (*W. Suzuki*) (SO). **Singapore**: 1 ♂, Macritchie Park, on dead *Areca* (Palmae), 22.vii.1976 (*S. Okajima*) (SO).

COMMENTS. According to the original description, this species was described from a unique female collected from 'Kallar 1200', Nilgiris, India'. However, the holotype female is labelled as 'Kallar 2000', Nilgiris'. Moreover, there is an allotype male of *mirandus* in T. N. Ananthakrishnan collection, but the date of collecting is three months after the date of the original published description. It therefore has no value as a paratype. On the other hand, there is another male labelled as 'allotype of *Polyphemothrips enormis* Ananthakrishnan' in this collection. This male cannot be distinguished from *mirandus* by the present author, and differs from *enormis* (now placed in the genus *Oidanothrips*) in having three sense cones on the third antennal segment. Moreover, this male bears the collecting data '16.xi.1969 from Dhoni Forest', although the original description of *enormis* refers to the allotype male as collected on 9.ii.1969 from Kallar 1200'. This specimen cannot be therefore be the valid allotype of *enormis*.

Specimens collected from West Malaysia and Singapore listed above have the anteroangular prothoracic setae longer, and a female from N. E. 30 km from Tapah, West Malaysia has brown midtibiae.

***Holothrips moundi* sp. n.**

(Figs 178–180)

FEMALE (MACROPTERA). Colour dark brown; metathorax and anterior portion of abdomen paler; foretibiae yellow, tinged with brown; mid and hindtibiae whitish yellow; tube brown, basal fifth and apical third shaded with dark brown; A1 brownish yellow, A2 yellow, brownish at base, A3 yellow, A4 brownish yellow, shaded apically, A5 brown, darkened apically, A6 and A7 dark brown, but A6 a little paler than A7; wings shaded with pale brown; major setae yellowish.

Head (Fig. 178) 1·20–1·26 times as long as broad, dorsal surface sculptured posteriorly, not strongly elevated; cheeks narrowed towards base; POS expanded at apex, longer than eye. Eyes shorter than one-third length of head. Antennae 1·71–1·74 times as long as head; A3 almost as long as A4; A7 with a reduced suture between MA7 and MA8. Mouth-cone pointed. Pronotum 1·4–1·5 times as broad as long, sculptured posteriorly; major setae expanded at apex. Forewings each with 17–18 DC; SWS expanded at apex. Pelta (Fig. 180) bell-shaped, longer than broad, sculptured weakly, with a pair of micro-pores (holotype female has abnormally only one pore). B1(T2–T8) and B2(T3–T6 and T8) blunt or expanded at apex, at least not sharply pointed, B1(T9) and B2(T7 and T9) sharply pointed. Tube (Fig. 179) almost straight-sided, distinctly narrowed apically, 0·75–0·78 times as long as head, 2·95–3·00 times as long as basal width, surface almost smooth. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L about 3500 (distended). Head L 393, W 326·5; eye L 102, W 90–102. Pronotum L 441, W 296; forewing L 1356. Pelta L 148, W 130. Tube L 306, basal W 102, apical W 47.5. A1 to A7 L(W): 82(66); 81(47); 112(61); 112(58·5); 93(48·5); 92(44·3); 97(32·5).

Length of setae: POS 110–120. Prothoracic AA 60–62, AM 56, ML 70–72, PA 102–107, EPIM 76–79. SWS1 56, SWS2 76·5–77, SWS3 76–79. B1(T9) 275, B2(T9) 306. Anals?

MALE. Unknown.

Holotype ♀ (mac.), **West Malaysia**: Gombak Field Stn, 16 ml. E. of Kuala Lumpur, on dead wood, 25.ix.1973 (*L. A. Mound*) (BMNH).

Paratype. **West Malaysia**: 1 ♀, Kuala Lumpur, on dead branches, 26.xii.1969 (*R. G. & F. Andre*) (BMNH).

Non-paratypic material. **West Malaysia**: 1 ♀, same data as paratype female (BMNH).

COMMENTS. This species may be related to *falcatus* from Sulawesi, but it can be distinguished from the latter by the following features; colour dark brown; head 1·20–1·26 times as long as broad; tube 0·75–0·78 times as long as head, 2·95–3·00 times as long as basal width; body a little smaller.

The non-paratypic female listed above may be a small individual of this species. It has a tube which is different in form from the type-material.

Holothrips nepalensis (Pelikan)

(Figs 141–143)

Adelothrips nepalensis Pelikan, 1970: 366–368. Holotype ♀, NEPAL (Innsbruck University) [not examined].

Holothrips nepalensis (Pelikan) Mound & Palmer, 1983: 94.

Female (macroptera). Colour dark brown; A3 yellow, shaded with brown at apical half, A4 to A6 dark brown, each with paler base; wings shaded with brown; major setae hyaline. Head (Fig. 141) 1·18–1·27 times as long as head, not strongly elevated; ocellar region slightly convexed; cheeks weakly rounded, constricted before base; POS long, almost half length of head, or a little shorter, sharply pointed at apex; suture between MA7 and MA8 complete; mouth-cone pointed; prothoracic AM reduced, other major setae blunt at apex; SWS1 and SWS2 blunt, SWS3 sharply pointed at apex; pelta (Fig. 143) bell-shaped, sculptured distinctly with polygonal reticulation, with a pair of micro-pores; T2 with one or two pairs of accessory WRS situated before regular pairs; B1(T8) and B2(T8) blunt at apex, all other major lateral setae on tergites sharply pointed; tube (Fig. 142) almost straight-sided, but very weakly constricted at basal fifth and near apex, about 0·8 times as long as head, about 3·0 times as long as basal width, surface almost smooth; anal setae shorter than tube.

Male (macroptera). Colour similar to female. Head 1·25–1·32 times as long as broad; pronotum 1·42–1·74 times as broad as long; forefemora and foretarsal tooth enlarged in large male; sternal reticulated areas very weakly developed, nearly absent; tube 0·82–0·87 times as long as head.

Material examined

India: 1 ♀, Darjeeling, Tiger Hill, on dead branches, 10.viii.1981 (*W. Suzuki*) (SO). **Nepal**: 6 ♀, 2 ♂, top of Mt Pulchoki, 2760 m, on evergreen *Quercus*, 20.vi.1981 (*W. Suzuki*) (SO; 3 ♀, 1 ♂, BMNH).

Comments. This species may be related to another new species described below under the name of *quadrisetis* from Darjeeling, India. Both of them are somewhat similar in head shape, but *nepalensis* has minute postocellar setae, whereas *quadrisetis* has well-developed ones which are longer than half the length of the postocular setae.

Holothrips nigripes sp. n.

(Figs 17–19)

Female (macroptera). Colour dark brown; head and tube darker than thorax and abdomen; A3 yellowish with darker apex; all tibiae and tarsi dark brown; wings shaded with brown, major setae yellowish.

Head (Fig. 17) elongate, about 1·8 times as long as broad or longer, dorsal surface more or less elevated, sculptured postero-laterally; cheeks almost straight, subparallel; POS long, about half length of head, nearly pointed at apex. Eyes about one-fourth length of head. Antennae about 1·8 times as long as head; A7 (Fig. 19) slender, longer than 0·4 times as long as broad, with a reduced suture between MA7 and MA8. Mouth-cone short and not pointed. Pronotum about 2·0 times as broad as long, without distinct sculpture; major setae blunt at apex, AM well developed. Forewings each with 41–46 DC; SWS blunt at apex. Pelta sculptured with weak reticulation, longer than broad, micro-pores absent. Anterior pair of WRS on T7 minute; B1(T2–T8) and B2(T3–T5 and T8) blunt at apex, B1(T9) and B2(T6, T7 and T9) long and pointed. Tube (Fig. 18) about 0·9 times as long as head, about 3·6 times as long as basal width, slightly constricted apically, surface smooth. Anal setae much shorter than tube.

Measurements of holotype female in μm. Total L about 5300 (distended). Head L 612, W 331; eye L 153, W 102. Pronotum L 275, W 551; forewing L 2544. Pelta L 245, W 179. Tube L 561, basal W 155, apical W 71.5. A1 to A7 L(W): 112(87); 112(61); 194(73); 196(76·5); 163(63); 138(51); 153(37).

Length of setae: POS 286–296. Prothoracic AA 102–148, AM 107–117, ML 224–240, PA 255–265, EPIM 219–230. SWS1 122–127, SWS2 168–176, SWS3 204–220. B1(T9) 485–495, B2(T9) 485–500. Anals 326.

Male (macroptera). Colour very similar to female. Head 1·76 times as long as broad; pronotum 1·9 times as broad as long, AA setae very long, but AM reduced; foretarsal tooth stout; B2(T6 and T7) long, but blunt, not pointed; tube 0·88 times as long as head, about 3·0 times as long as basal width; sternal reticulated areas present on S5 to S7.

Measurements of paratype male in μm. Total L about 5000 (distended). Head L 520, W 296; eye L 133–137, W 86–92. Pronotum L 276, W 525; forewing L 2400. Pelta L 235, W 204. Tube L 457, basal W 153, apical W 71. A1 to A7 L(W): 107(83); 112(51); 173(66); 163 (71); 138(57); 122(49); 150(36).

Length of setae: POS 250–300. Prothoracic AA more than 300, AM about 30, ML about 300, PA about 300, EPIM1 about 170–180. SWS1 110, SWS2 150, SWS3 175. B1(T9) 420–425. Anals 300–320.

Holotype ♀ (mac.), **Java**: Mt Tengger, on dead leaves, 14.x.1981 (*T. Senoh*) (BMNH).

Paratypes. **Java**: 1 ♀, Tjibodas Gardens, on dead twigs, 23.x.1973 (*L. A. Mound*) (BMNH); 1 ♂, Mt Arujuna, on dead leaves, 19.iv.1981 (*T. Senoh*) (SO).

COMMENTS. This species is closely related to *mirandus*, but it can be distinguished by the following features: all tibiae and tarsi brown; head more than 1·75 times as long as broad; reticulation of pelta weaker; tube more than 3·5 times as long as basal width in female, about 3·0 times in male.

There is a female from central Sulawesi (Pedamaran, nr Rantepao, 10.viii.1984) in the author's collection, which is very similar to this species as well as *mirandus*, although it has the third antennal segment dark.

Holothrips nigritus (zur Strassen)

Holmiella nigrita zur Strassen, 1972: 96–98. Holotype ♀, KENYA (Naturhistoriska Riksmuseet, Stockholm, Sweden) [not examined].
Holothrips nigrita (zur Strassen) Mound & Palmer, 1983: 94.

This species was described from a unique female. According to the original description, *nigritus* is well isolated from all the other members of the genus by having the reduced anteroangular prothoracic setae. The head and thorax are somewhat similar to those of *ruidus* and its relatives. However, in *nigritus* the head may be more distinctly elevated and the mid-vertex (mid-dorsal) head setae are longer.

Holothrips oceanicus sp. n.

(Figs 92–94, 110)

FEMALE (MACROPTERA). Colour brown; head darkest, intermediate abdominal segments somewhat paler; A1 brownish, paler than head, A2 yellowish, with brownish base, A3 yellowish, with brownish apex, A4 to A7 brown, A4 and A5 with pale bases; all femora brown, all tibiae yellow; tube brown, tinged with orange yellow, with pale base and apex, but extreme apex greyish; wings shaded with pale brown; major setae hyaline.

Head (Fig. 92) 1·23 times as long as broad, dorsal surface elevated, generally sculptured; cheeks very weakly rounded or rather straight, subparallel; POS shorter than one-fourth length of head, expanded at apex. Eyes slightly prolonged on ventral surface. Antennae 1·68 times as long as head; A7 (Fig. 94) with a reduced suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum small, 2·16 times as broad as long, weakly sculptured anteriorly and posteriorly, with a weak median line; major setae expanded at apex. Pelta (Fig. 110) bell-shaped, with distinct reticulation, micro-pores absent. Forewings each with 11 DC; SWS expanded at apex. B1(T2–T8) and B2(T3–T6 and T8) expanded at apex, B1(T9) weakly expanded, B2(T7 and T9) sharply pointed. Tube (Fig. 93) weakly constricted at basal fourth and apex, 0·68 times as long as head, about 2·3 times as long as basal width. Anal setae a little longer than tube.

Measurements of holotype female in μm. Total L about 2800 (distended). Head L 337, W 275; eye dorsal L 72–76, ventral L 96–97, W 77–82. Pronotum L 163, W 352; forewing L 1110. Pelta L 122, W 158. Tube L 230, basal W 99, apical W 43. A1 to A7 L(W): 56(51); 71(38); 89(42); 87(41); 82(36); 76·5(36); 87(28).

Length of setae: POS about 75. Prothoracic AA about 50, AM 46–50, ML about 50, PA 72–77, EPIM about 70. SWS1 46, SWS2 56, SWS3 87. B1(T9) 153, B2(T9) 210–220. Anals 255.

MALE. Unknown.

Holotype ♀ (mac.), **Australia**: N.S.W., Abercrombie Rv., 20 ml N. Taralga, on *Eucalyptus* dead leafy branches, 2.iv.1968 (*L. A. Mound*) (Australian National Insect Collection, Canberra).

COMMENTS. This species may be related to *australis*, but can easily be distinguished by the following features: antennae longer than 1·6 times as long as head; cheeks almost straight, at least not emarginate; suture between MA7 and MA8 reduced; tube longer than 0·6 times length of head. The eyes of this species, which are prolonged on the ventral surface, are somewhat similar to those of *cephalicus*. However, *cephalicus* has different sculpture on the dorsal surface of the head.

Holothrips ogasawarensis sp. n.

(Figs 8, 98, 99)

FEMALE (MACROPTERA). Colour uniformly dark brown; basal half of A3 yellow, basal two-fifths of A4 and A5 brownish yellow, basal one-third of A6 yellowish brown, A4 to A6 each with dark extreme base; wings shaded with pale brown, major setae yellowish.

Head (Fig. 98) 1·27 times as long as broad, sculptured distinctly, slightly elevated dorsally; cheeks almost straight; POS blunt at apex, about 0·4 times as long as head. Eyes comparatively small, 0·22–0·23 times as

long as head. Antennae 2·13 times as long as head; A7 2·5–2·6 times as long as broad, with a complete suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum small, 2·14 times as broad as long, weakly sculptured posteriorly, with a moderate median line; major setae blunt or very weakly expanded at apex. Forewings each with 17 DC; SWS blunt at apex. Foretarsal tooth short, directed forwards. Pelta irregularly bell-shaped or rather triangular, micro-pores absent. B1(T2–T8) and B2(T3–T8) blunt at apex, B1(T9) and B2(T9) sharply pointed. Tube (Fig. 99) straight-sided, 0·69 times as long as head, 2·17 times as long as basal width, surface smooth. Anal setae a little shorter than tube.

Measurements of holotype female in μm. Total L about 3800 (distended). Head L 382, W 301; eye L 87–88, W 77–79. Pronotum L 178, W 382; forewing L 1420. Pelta L 168, W 214. Tube L 265, basal W 122, apical W 57. A1 to A7 L(W): 92(71); 87(49); 143(62); 148(61); 127(58); 113(51); 107(42).
Length of setae: POS 153–158. Prothoracic AA 75, AM 69–72, ML 110–120, PA 135–145, EPIM about 140. SWS1 67–71, SWS2 120–130, SWS3 132–170. B1(T9) 255–265, B2(T9) 265. Anals 240–250.

Male (macroptera). Colour very similar to female. Head 1·23–1·25 times as long as broad; pronotum 1·95 times as broad as long; forewings each with 14–16 DC; forefemora slightly enlarged, foretarsal tooth stout, directed inwards; sternal reticulated areas present on S6 and S7 (Fig. 8); tube about 0·7 times as long as head, 1·84 times as long as basal width, weakly sculptured on ventral surface.

Measurements of paratype male in μm. Total L about 3100 (distended). Head L 331, W 270; eye L 76–77, W 65–67. Pronotum L 199, W 388; forewing L 1250. Pelta L 153, W 219. Tube L 235, basal W 128, apical W 53. A1 to A7 L(W): 77(61); 76(45); 127(51); 122(56); 112(51); 107(48); 97(40).

Holotype ♀ (mac.), **Japan**: Ogasawara Is, Haha-jima I., 18.v.1984 (*M. Hasegawa*) (SO).
Paratypes. **Japan**: 6 ♀, 13 ♂, Ogasawara Is, Haha-jima I., Koshinzuka, 1.xii.1977 (*M. Tomokuni*) (SO; 3 ♀, 5 ♂, BMNH).

Comments. All the paratypes of this species are more or less damaged due to the method of collection, and most of major setae are missing. This species is very similar to *japonicus* and *latidentis*, also from Japan, but it can easily be distinguished by the paler antennal coloration.

Holothrips okinawanus sp. n.

(Figs 95–97)

Female (macroptera). Colour uniformly dark brown; A3 a little paler than A4; tarsi somewhat paler than tibiae, but shaded with dark brown; wings shaded with pale brown; major setae brownish.

Head (Fig. 95) 1·19 times as long as broad, somewhat elevated dorsally, not sculptured near median longitudinal line; cheeks almost straight, gradually narrowed towards base; POS nearly pointed at apex, 0·35–0·39 times as long as head. Eyes broader than long, 0·24–0·26 times as long as head. Antennae about 2·0 times as long as head; A7 (Fig. 97) about 2·5 times as long as broad, with a complete suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum 2·47 times as broad as long, with a weak median line, sculptured posteriorly; AM slender, nearly pointed, AA, ML and EPIM weakly expanded at apex, PA long and pointed; inner side of probasisternum irregularly rounded. Foretarsal tooth short and directed forwards. Forewings each with 20 DC; SWS1 weakly expanded, SWS2 and SWS3 nearly pointed. Pelta triangular, with weak sculpture, micro-pores absent. B1(T8) and B2(T8) blunt, B2(T3) blunt or nearly pointed, B1(T2–T7 and T9) and B2(T4–T7 and T9) sharply pointed at apex. Tube (Fig. 96) almost straight-sided, gradually narrowed towards apex, 0·64 times as long as head, 1·93 times as long as basal width, surface smooth; anal setae a little shorter than tube.

Measurements of holotype female in μm. Total L about 3600 (distended). Head L 382, W 321; eye L 92–94, W 97. Pronotum L 163, W 403; forewing L 1420. Pelta L 173, W 198. Tube L 246, basal W 128, apical W 56. A1 to A7 L(W): 89(66); 87(46); 133(54); 128(57); 122(52); 101(49); 107(41).
Length of setae: POS 135–148. Prothoracic AA about 90, AM 56–61, ML 90–95, PA 147–150, EPIM 120–132. SWS1 72–78, SWS2 153–154, SWS3 178. B1(T9) 224–225, B2(T9) 225–230. Anals 220–224.

Male (macroptera). Colour very similar to female. Head longer, 1·32–1·33 times as long as broad; eyes longer than broad; pronotum 2·05 times as broad as long; forefemora somewhat enlarged, foretarsal tooth stouter, directed inwards; abdominal reticulated areas present on S5–S7; B2(T3) blunt, sometimes weakly expanded; tube about 0·6 times as long as head, 1·76 times as long as basal width; anal setae almost as long as tube.

Measurements of paratype male in μm. Total L about 3300 (distended). Head L 382, W 288; eye L 96–98, W

77–78. Pronotum L 194, W 398; forewing L 1480. Pelta L 163, W 204. Tube L 224, basal W 128, apical W 54. A1 to A7 L(W): 87(67); 87(41); 184(51); 128(54); 107(50); 97(46); 92(41).

Length of setae: POS 140–160. Prothoracic AA 70–80, AM 50–52, ML 90–92, PA 138, EPIM 100–115. SWS1 97, SWS2 163, SWS3 179. B1(T9) 214–235, B2(T9) 45–50. Anals 220–230.

Holotype ♀ (mac.), **Japan**: Ryukyu Is, Okinawa I., Kunigami-son, nr Benoki, on dead fallen branches, 30.x.1979 (*S. Okajima*) (SO).

Paratypes. **Japan**: 3 ♂, collected with holotype (BMNH; 1 ♂, SO).

Non-paratypic material. **Japan**: 1 ♀, 1 ♂, Ryukyu Is, Iriomote I., nr Mt Tedou, on dead leaves, 19.vi.1972 (*S. Okajima*) (SO). **Taiwan**: 2 ♂, Nantou Hsien, nr Jiuyuentan (Sun Moon Lake), on dead branches, 31.iii.1984 (*S. Okajima*) (SO); 1 ♀, 2 ♂, Nantou Hsien, foot of Mt Nankao-shan, Wanta, on dead branches, 1.iv.1984 (*S. Okajima*) (SO).

COMMENTS. This species is most similar to *latidentis* from Japan, but it can be distinguished by the following features: A7 shorter, less than 2·6 times as long as broad; prothoracic AA, SWS and most of B1 and B2 on tergites pointed at apex.

Some non-paratypic females and males listed above are more or less different from the type-series in the shape of the head and pelta, but it is not possible to know if these are local variations, aberrations or another new species.

Holothrips parallelus sp. n.

(Figs 11, 12)

FEMALE (MACROPTERA). Colour brown to dark brown; basal half of tube darkest, but with pale base; all femora brown, concolorous with body, foretibiae pale yellow, tinged with pale brown, mid and hindtibiae whitish yellow; A1 and A2 brown, almost concolorous with head, A3 to A5 yellow, A4 and A5 with brown apices, A6 yellow at basal third, but with dark extreme base, brown to dark brown at apical two-thirds, A7 dark brown, a little darker than A1; wings shaded with pale brown; major setae yellowish.

Head (Fig. 11) about 1·4 times as long as broad, dorsal surface weakly elevated, weakly sculptured with transverse rows of striae or reticulation; cheeks almost straight, subparallel; POS 0·3 times as long as head or a little longer, blunt or weakly expanded at apex. Eyes about one-fourth length of head. Antennae 1·83 times as long as head; A7 with a reduced suture between MA7 and MA8. Mouth-cone more or less pointed. Pronotum small, about 1·9 times as broad as long, weakly sculptured posteriorly; major setae blunt, but AM almost pointed at apex. Forewings each with about 10 DC; SWS blunt or weakly expanded at apex. Foretarsal tooth directed forwards. Pelta elongately hat-shaped, sculptured weakly, micro-pores absent. B1(T2–T8) and B2(T8) weakly expanded at apex, B2(T3 and T4) blunt or nearly pointed, B1(T9) and B2(T5–T7 and T9) sharply pointed. Fore pair of WRS on T7 reduced, hind pair on T7 short and rather straight. Tube (Fig. 12) short, almost straight-sided, gradually narrowed towards apex, 0·55 times as long as head, about 1·8 times as long as basal width, surface smooth. Anal setae longer than tube.

Measurements of holotype female in μm. Total L 3250 (distended). Head L 342, W 245; eye L 90–92, W 72–76. Pronotum L 184, W 352; forewing L 1325. Pelta L 132, W 153. Tube L 189, basal W 103, apical W 49. A1 to A7 L(W): 61(54); 66(40); 107(46); 104(46); 92(41); 82(40); 84(33).

Length of setae: POS 105–110. Prothoracic AA about 35, AM 40–45, ML about 50, PA 88–97, EPIM 80–86. SWS1 51–56, SWS2 61–66, SWS3 87–92. B1(T9) 174–188, B2(T9) 199–204. Anals 214–220.

MALE (MACROPTERA). Colour very similar to female. Head about 1·3 times as long as broad; pronotum 1·86 times as broad as long; foretarsal tooth stouter, directed inwards; forewings each with 6–8 DC; fore pair of WRS on T7 developed, sigmoid; abdominal reticulated areas present on S5 and S6, but weakly developed; tube 0·56 times as long as head, 1·63 times as long as basal width.

Measurements of paratype male in μm. Total L 2450 (distended). Head L 282, W 219; eye L 72–77, W 65–67. Pronotum L 169, W 315; forewing L 1110. Pelta L 112, W 110. Tube L 153, basal W 97, apical W 44. A1 to A7 L(W): 56(48); 58(34); 92(41); 87(43); 76(36); 71(36); 71(28).

Length of setae: POS 96–98. Prothoracic AA 40–48, AM 42–46, ML 66–68, PA 88–97, EPIM 92–95. SWS1 52–55, SWS2 61–69, SWS3 87–97. B1(T9) 179–184, B2(T9) about 40. Anals 194–198.

Holotype ♀ (mac.), **Sulawesi**: nr Rantepao, Pedamaran, on dead twigs with leaves, 10.viii.1984 (*S. Okajima*) (BMNH).

Paratypes. **Sulawesi**: 7 ♀, 10 ♂, collected with holotype (SO; 3 ♀, 5 ♂, BMNH).

Non-paratypic material. **Sulawesi**: 3 ♀, collected with holotype (SO).

COMMENTS. This species is very similar to *brevitubus* from the Philippines, but the body is more strongly sclerotized and darker. Three non-paratypic females listed above have the tube somewhat slender. Moreover, one of them has well-developed wing retaining setae on the seventh tergite.

Holothrips peltatus sp. n.

(Figs 151–153, 169)

FEMALE (MACROPTERA). Colour dark brown; A3 yellowish brown, darkened apically; wings shaded with brown; major setae yellowish.

Head (Fig. 151) about 1·2 times as long as broad, dorsal surface weakly sculptured postero-laterally, not strongly elevated; cheeks weakly rounded; POS nearly pointed, much longer than eye. Eyes about 0·3 times as long as head. Antennae 2·10–2·15 times as long as head; A3 and A4 subequal in length; A7 (Fig. 153) with an incomplete suture between MA7 and MA8. Mouth-cone long and pointed. Pronotum about 1·7 times as broad as long, strongly sculptured posteriorly; major setae blunt, AM a little shorter than AA. Forewings each with 28–33 DC; SWS blunt or weakly expanded at apex, SWS2 and SWS3 subequal in length. Pelta (Fig. 169) distinct, shaded with dark brown, about 0·8 times as long as broad, with distinct reticulation, usually with a pair of micro-pores. T2 with one or two pairs of accessory WRS before regular pairs. B1(T2–T8) and B2(T3, T4 and T8) blunt, at least not pointed, B1(T9) and B2(T5–T7 and T9) sharply pointed. Tube (Fig. 152) almost as long as head, 2·70–2·75 times as long as basal width, weakly constricted apically, dorsal surface weakly sculptured. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L 4660 (distended). Head L 372, W 305; eye L 110. Pronotum L 270, W 464; forewing L 2014. Pelta L 194, W 240. Tube L 377, basal W 138, apical W 61. A1 to A7 L(W): 92(71·5); 97(51); 138(61); 138(61); 122(48·5); 112(46); 117(37).

Length of setae: POS 153–163. Prothoracic AA 56–70, AM 50–60, ML 86–95, PA 178–183, EPIM 168–172. SWS1 64–68, SWS2 138–152, SWS3 127–155. B1(T9) 372–388, B2(T9) 357–362. Anals 265.

MALE (MACROPTERA). Colour and structure very similar to female. Head about 1·2 times as long as broad; sternal reticulated areas present on S5 and S6, but weakly developed; tube 0·92 times as long as head, 2·3 times as long as basal width.

Measurements of paratype male in μm. Total L about 3500 (distended). Head L 321, W 265; eye L 97, W 72. Pronotum L 230, W 398; forewing L 1728. Pelta L 153, W 204. Tube L 296, basal W 130, apical W 61. A1 to A7 L(W): 76·5(61); 71(41); 117(56); 122(56); 112(46); 97(43); 107(36).

Length of setae: POS 127–148. Prothoracic AA 66–71, AM 56–66, ML 97–122, PA 153, EPIM 143–148. SWS1 66–71, SWS2 122–128, SWS3 142–148. B1(T9) 321–330, B2(T9) 71–92. Anals 229–250.

Holotype ♀ (mac.), **West Malaysia**: Cameron Highland, Tanah Rata, on dead leaves, 1.iii.1976 (*W. Suzuki*) (BMNH).

Paratypes. **West Malaysia**: 1 ♂, collected with holotype (SO); 4 ♀, 1 ♂, Ringlet, on dead branches, 12.x.1973 (*L. A. Mound*) (BMNH).

COMMENTS. This species is most similar to *fumidus*, but it can be distinguished by the following features: pelta bell-shaped, sculptured distinctly, about 0·8 times as long as broad, shaded with dark brown; B1(T2–T8) blunt at apex, at least not pointed; tube longer, almost as long as head in female, dorsal surface weakly sculptured; A3 and A4 subequal in length. The holotype female has no micro-pores on the pelta, although all the paratype females and males have a pair of micro-pores on each pelta. The author considers that the absence of micro-pores from the holotype is an aberration.

Holothrips peninsulae sp. n.

(Figs 5, 29–32)

FEMALE (MACROPTERA). Colour brown; tube brownish, tinged with orange-yellow, with apical third dark brown; foretibiae a little paler; A3 with basal half yellowish; wings shaded with pale brown, major setae yellowish.

Head (Fig. 29) about 1·1 times as long as broad, dorsal surface sculptured laterally, the remaining portion smooth, not strongly elevated; cheeks weakly incut just behind eyes, slightly constricted near base; POS blunt or weakly expanded at apex, shorter than eye. Eyes 0·35 times as long as head. Antennae 2·2–2·3 times as long as head; A7 (Fig. 31) with a reduced suture between MA7 and MA8. Mouth-cone short and not pointed; maxillary stylets 20–25 μm apart from each other at the middle of head, not reaching eyes; very weak maxillary bridge present. Pronotum about 2·0 times as broad as long, weakly sculptured

posteriorly; major setae blunt or expanded at apex. Forewings each with 12–14 DC; SWS1 and SWS2 weakly expanded, SWS3 pointed at apex. Foretarsal tooth blunt. Pelta (Fig. 32) bell-shaped, a little broader than long, micro-pores absent. All B1 and B2 setae blunt, at least not sharply pointed. Tube (Fig. 30) constricted apically, about 1·2 times as long as head, about 2·7 times as long as basal width, with some longitudinal wrinkles, dorsal surface weakly sculptured. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L about 2900 (distended). Head L 265, W 240; eye L 94, W 73–76. Pronotum L 158, W 321; forewing L 1314. Pelta L 163, W 178. Tube L 316, basal W 117, apical W 52. A1 to A7 L(W): 61(57); 66(41); 97(51); 112(46); 102(41); 87(36); 97(27).

Length of setae; POS 76–85. Prothoracic AA 40–45, AM 40–45, ML 51–56, PA 112, EPIM 102. SWS1 74–77, SWS2 112–117, SWS3 153–175. B1(T9) 245–270, B2(T9) 280–289. Anals 219–230.

MALE (MACROPTERA). Colour very similar to female. POS longer than eye; pronotum about 1·8 times as broad as long; forefemora enlarged, foretarsal tooth stout; forewings each with 10–12 DC; tube 1·1–1·3 times as long as head, 2·5–2·6 times as long as basal width; sternal reticulated areas undeveloped, but with worm-like areas on each side of S6 (Fig. 5).

Measurements of paratype male in μm. Total L 2550 (distended). Head L 240, W 215; eye L 87, W 66. Pronotum L 168, W 311; forewing L 1220. Pelta L 128, W 163. Tube L 270, basal W 106, apical W 50. A1 to A7 L(W): 57(51); 66(36); 86(45); 97(44); 87(36); 76·5(30·5); 86(25).

Length of setae: POS 92–100. Prothoracic AA 41–46, AM 46–51, ML 87–97, PA 107–133, EPIM 102–107. SWS1 71–76, SWS2 97–117, SWS3 168. B1(T9) 230–235, B2(T9) 51–61. Anals 138–153.

Holotype ♀ (mac.), **West Malaysia**: Tapah, on dead leaves, 30.vii.1976 (*S. Okajima*) (BMNH).

Paratypes. **West Malaysia**: 11 ♀, 4 ♂, collected with holotype (SO; 5 ♀, 2 ♂, BMNH).

Non-paratypic material. **West Malaysia**: 1 ♀, Kuala Lumpur, on dead branches, 29.xii.1969 (*R. G. & F. Andre*). **Singapore**: 1 ♀, Macritchie Park, on dead twigs and leaves, 19.viii.1980 (*L. A. Mound*) (BMNH).

COMMENTS. This species belongs to the *apoensis*-group. It resembles *apoensis* from Mindanao, Philippines, in general appearance, and the differences between them are discussed under the latter species.

H. caudatus from Sarawak may be closely related to this species, but differs in having sharply pointed postocular setae and a short head which is almost as long as broad. However, the unique holotype female of *caudatus* is rather damaged, so that the present author cannot compare them closely. Two non-paratypic females listed above may be conspecific with this species. The female from Kuala Lumpur has the maxillary stylets situated nearer to each other, and the female from Singapore is in somewhat poor condition.

Holothrips pictus sp. n.

(Figs 130–132)

FEMALE (MACROPTERA). Colour yellowish brown to brown; head yellow, tinged with brown anteriorly; prothorax brown, in contrast with yellow head; mesothorax brown, slightly paler than prothorax; metathorax yellow; abdomen yellowish brown; tube orange yellow, paler basally and apically, with dark extreme apex; all femora pale brown, but forefemora somewhat yellowish; A1 to A3 yellowish, A3 shaded with brown at apex, A4 to A7 brown, A4 slightly paler at base; wings shaded with pale brown; major setae yellowish.

Head (Fig. 130) 1·15–1·17 times as long as broad, broadest across cheeks just behind eyes, dorsal surface not strongly elevated, sculptured postero-laterally, but weak; cheeks weakly rounded, gradually narrowed towards base; POS expanded at apex, almost as long as eye. Eyes about 0·3 times as long as head. Antennae about 1·9 times as long as broad; A7 with a reduced suture between MA7 and MA8. Mouth-cone long and pointed. Pronotum 1·5–1·6 times as broad as long, weakly sculptured posteriorly; major setae expanded at apex. Forewings each with 9–10 DC; SWS expanded at apex. Pelta (Fig. 132) bell-shaped, a little broader than long, with very weak reticulation, with a pair of micro-pores. B1(T2–T8) and B2(T3–T6 and T8) expanded at apex, B1(T9) and B2(T7 and T9) sharply pointed at apex. Tube (Fig. 131) weakly constricted at basal third and apex, 0·73–0·75 times as long as head, 2·2–2·3 times as long as basal width, surface smooth. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L about 3000 (distended). Head L 296, W 255; eye L 92, W 66–70. Pronotum L 209, W 331; forewing L 1134. Pelta L 128, W 143. Tube L 219, basal W 97, apical W 41. A1 to A7 L(W): 56(56); 71(38); 89(46); 92(46); 76(41); 76(37); 87(28).

Length of setae: POS 87–92. Prothoracic AA 36–46, AM 36–40, ML 61–70, PA 76, EPIM 71–87. SWS1 46–50, SWS2 61–66, SWS3 65. B1(T9) 219–224, B2(T9) 240–255. Anals 178–219.

MALE (MACROPTERA). Colour very similar to female. Pronotum with a distinct median line; sternal reticulated areas present on S6 and S7; tube 0·75 times as long as head, ventral surface with transverse rows of fine sculpture.

Measurements of paratype male in μm. Total L about 2500 (distended). Head L 270, W 250; eye L 77–82. Pronotum L 189, W 331; forewing L 1007. Pelta L 117, W 123. Tube L 204, basal W 92, apical W 38.

Length of setae: POS 97. Prothoracic AA 61–65, AM 43–46, ML 76–80, PA 76–80, EPIM 70–75. SWS1 46, SWS2 66, SWS3 68–71. B1(T9) 199–215, B2(T9) 70. Anals 188.

Holotype ♀ (mac.), **Philippines**: Luzon, nr Daet, Bicol National Park, on dead branches, 13.viii.1979 (*S. Okajima*) (BMNH).

Paratypes. **Philippines**: 1 ♂, Luzon, same locality as holotype, on dead leaves, 11.viii.1979, 1 ♀, on dead leaves, 12.viii.1979 (*S. Okajima*) (♂, BMNH; ♀, SO).

Non-paratypic material. **Philippines**: 1 ♂, Mindanao, North Cotabato, Ilomavis, on dead leaves, 28.vii.1979 (*S. Okajima*); 1 ♂, Mt Apo, Agko, *c.* 1300 m, on dead leaves, 3.viii.1979 (*S. Okajima*) (SO). **Java**: 1 ♀, Bogor Gardens, on dried legume stems, 28.x.1973 (*L. A. Mound*) (BMNH). **Sulawesi**: 2 ♀, nr Rantepao, Pedamaran, on dead branches, 10.viii.1984 (*S. Okajima*) (SO). **West Malaysia**: 2 ♀, 1 ♂, Kuala Lumpur, on dead branches, 26.xii.1969, 1 ♀, 29.xii.1969 (*R. G. & F. Andre*) (BMNH). **Singapore**: 1 ♀, on dead twigs, 4.xi.1973 (*L. A. Mound*) (BMNH). **Hawaii**: 1 ♀, Kauai I., sweeping, 15.x.1983 (*D. M. Lasalle*) (W. H. Ewart collection, University of California-Riverside).

COMMENTS. This species is similar to *indicus* and *andamanensis*. However, from *indicus* it can easily be distinguished by the following features: A7 with a reduced suture between MA7 and MA8; B1 and B2 setae on T9 longer; tube longer, more than 0·7 times as long as head, slightly constricted at basal third and apex. From *andamanensis* it differs in the antennal coloration, the length of the prothoracic setae and the proportions of the tube.

The non-paratypic specimens listed above are probably conspecific with this species, but some differences (e.g. antennal coloration, body size, and relative length of tube, etc.) have been found between localities. A female from Hawaii seems to have been transported artificially from South East Asia.

Holothrips porifer sp. n.

(Figs 160, 161, 171)

FEMALE (MACROPTERA). Colour brown; head and prothorax darkest, abdomen paler medially, brownish laterally; all femora brown with paler apices, all tibiae and tarsi yellow, foretibiae often with brown shadings; A1 yellowish brown, distinctly paler than head, A2 yellow to brownish yellow, a little paler than A1, A3 yellow shaded with brown apically, A4 to A7 brown, somewhat greyish, but A4 to A6 with yellow bases; wings shaded with pale brown; major setae yellowish.

Head (Fig. 160) 1·17–1·23 times as long as broad, dorsal surface not strongly elevated, sculptured postero-laterally; cheeks weakly rounded; POS expanded at apex, almost one-third length of head or a little shorter. Eyes 0·29–0·30 times as long as head. Antennae 1·78–1·85 times as long as head; A3 and A4 subequal in length; suture between MA7 and MA8 incomplete. Mouth-cone long and pointed. Pronotum 1·85–1·92 times as broad as long, major setae expanded at apex, AM setae slender. Forewings each with 12–14 DC; SWS expanded at apex. Foretarsal tooth directed laterally. Pelta (Fig. 171) bell-shaped, with a pair of micro-pores. B1(T2–T8) and B2(T3–T5 and T8) expanded at apex, B1(T9) and B2(T6, T7 and T9) sharply pointed. Tube (Fig. 161) very weakly constricted at basal fourth and near apex, 0·79 times as long as head, about 2·4 times as long as basal width, surface very weakly sculptured. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L 3230 (distended). Head L 322, W 276; eye L 95–97, W 72–76. Pronotum L 178, W 342; forewing L 1134. Pelta L 112, W 126. Tube L 255, basal W 107, apical W 49. A1 to A7 L(W): 66(56); 76(40); 92(46); 93(46); 77(38); 71(36); 92(31).

Length of setae: POS 96–102. Prothoracic AA 62–65, AM 50–53, ML 85–90, PA 92–94, EPIM 94–96. SWS1 about 50, SWS2 76, SWS3 112–117. B1(T9) 260–270, B2(T9) 265–270. Anals 255–260.

MALE (MACROPTERA). Colour very similar to female, but forefemora a little paler. Head 1·19–1·22 times as long as broad; pronotum well developed, with a strong median line, 1·55–1·60 times as broad as long; forefemora somewhat enlarged, foretarsal tooth stout, rather triangular; sternal reticulated areas present on S5 to S7; anal setae a little longer than tube.

Measurements of paratype male in μm. Total L 2980 (distended). Head L 306, W 250; eye L 97, W about 70.

Pronotum L 234, W 362; forewing L 1280. Pelta L 128, W 127. Tube L 230, basal W 104, apical W 49. A1 to A7 L(W): 70(56); 78(36); 97(45); 97(46); 82(36); 71(36); 89(31).

Length of setae: POS 107–110. Prothoracic AA 82–87, AM 46–56, ML 112–117, PA 100–102, EPIM about 110. SWS1 71, SWS2 87–92, SWS3 128–138. B1(T9) 255–258, B2(T9) 82–88. Anals 255.

Holotype ♀ (mac.), **Taiwan**: Pingtung Hsien, Kenting National Park, on dead branches, 18.iii.1984 (*S. Okajima*) (BMNH).

Paratypes. **Taiwan**: 2 ♀, 4 ♂, collected with holotype; 1 ♀, nr Taipei, on dead fern, 21.vii.1975 (*S. Okajima*) (SO; 1 ♀, 2 ♂, BMNH). **Japan**: 1 ♀, Ryukyu Is, Amami-ohshima I., Hatsuno, on dead branches, 3.vii.1972 (*S. Okajima*); 1 ♂, Ryukyu Is, Iriomote I., Mt Tedou, on dead leaves, 19.vi.1972 (*S. Okajima*); 2 ♂, Ryukyu Is, Yonakuni, I., Mt Urabu, on dead leaves, 19.iii.1977 (*W. Suzuki*) (SO; 1 ♂, BMNH).

COMMENTS. This species is somewhat similar to *ananthakrishnani* from India, but it can be distinguished by the paler coloration and longer head.

Holothrips pulchellus sp. n.

(Figs 123–126)

FEMALE (MACROPTERA). Bicolorous yellow and brownish yellow to brown; head yellow, shaded with brown anteriorly; prothorax brownish yellow; mesothorax brown, a little darker than prothorax; abdomen brownish yellow to yellowish brown; tube orange yellow, with dark apex; forefemora brownish yellow, mid and hindfemora yellowish brown, with paler bases and apices; foretibiae yellow, mid and hindtibiae whitish yellow; A1 and A2 yellow, paler than anterior portion of head, A3 to A7 brown to dark brown, darkened towards apex, A3 with yellow extreme base; wings shaded with pale brown, major setae yellowish.

Head (Fig. 123) 1·20–1·25 times as long as broad, dorsal surface sculptured posteriorly, anterior half smooth, not strongly elevated; cheeks slightly rounded, weakly constricted basally; POS expanded at apex, much longer than eye. Eyes shorter than one-third length of head. Antennae 2·0–2·1 times as long as head; A7 (Fig. 126) with a reduced suture between MA7 and MA8. Mouth-cone pointed. Pronotum 1·40–1·52 times as broad as long, weakly sculptured posteriorly; major setae expanded at apex, AM well developed, almost as long as AA. Forewings each with 13–17 DC; SWS expanded at apex. Pelta (Fig. 125) bell-shaped, almost as long as broad or a little longer, sculptured weakly, with a pair of micro-pores. B1(T2–T8) and B2(T3–T5 and T8) expanded at apex, B1(T9) and B2(T6, T7 and T9) sharply pointed at apex. Tube (Fig. 124) slightly narrowed at basal fourth and apex, about 0·8 times as long as head, about 2·5 times as long as basal width, surface smooth. Anal setae longer than tube.

Measurements of holotype female in μm. Total about 3100 (distended). Head L 344, W 275·5; eye L 102, W 76·5. Pronotum L 265, W 3787; forewing L 1400. Pelta 151, W 138. Tube L 275, basal W 110, apical W 51. A1 to A7 L(W): 77(66); 84(43·3); 127(56); 122(53); 102(45); 94(37·7); 102(32).

Length of setae: POS 112–115. Prothoracic AA 72–75, AM 68–72, ML 113–115, PA 110–112, EPIM 102–105. SWS1 81–82, SWS2 112–116, SWS3 122–142. B1(T9) 280, B2(T9) 270–275. Anals 290–311.

MALE. Unknown.

Holotype ♀ (mac.), **West Malaysia**: Tanah Rata, on dead branches, 24.vii.1976 (*S. Okajima*) (BMNH).

Paratype. **West Malaysia**: 1 ♀, Gombak, on dead branches, 13.x.1973 (*L. A. Mound*) (BMNH).

COMMENTS. The antennal coloration of this species is characteristic, the first and second segments being yellow and paler than the anterior part of head. The relationships of this species are unknown.

Holothrips quadrisetis sp. n.

(Figs 137–140)

FEMALE (MACROPTERA). Colour uniformly dark brown; head darkest; all tibiae shaded brown at apical two-thirds, yellowish at basal third; A1 and A7 dark brown, A2 yellowish, A3 yellow in basal half, with brown shading in apical half, A4 to A6 dark brown, with yellow bases; wings shaded with pale brown, major setae hyaline, but anal setae somewhat darker.

Head (Fig. 137) 1·39–1·47 times as long as broad, dorsal surface distinctly sculptured postero-laterally, more or less elevated; cheeks almost straight or very weakly rounded, gradually, but weakly narrowed towards base; ocellar region convexed; postocellar setae long and stout, much longer than half length of

POS, sharply pointed at apex; POS long, almost half length of head or longer, sharply pointed at apex. Eyes about one-fourth length of head. Antennae 1·80–1·84 times as long as head; A3 longer than A4; suture between MA7 and MA8 complete (Fig. 140). Mouth-cone rather pointed. Pronotum 1·85–2·10 times as broad as long, weakly sculptured posteriorly; major setae blunt or nearly pointed at apex, AM minute, EPIM a little longer than PA. Forewings each with 18–33 DC; SWS1 and SWS2 blunt, SWS3 usually long and sharply pointed at apex. Pelta (Fig. 139) bell-shaped, 0·87–1·10 times as long as broad, with a pair of micro-pores. T2 with one or two pairs of accessory WRS; B1(T8) and B2(T8) blunt at apex, all the other B1 and B2 setae on tergites sharply pointed at apex. Tube (Fig. 138) almost straight-sided, 0·75–0·80 times as long as head, 2·9–3·0 times as long as basal width, surface rather smooth. Anal setae shorter than tube.

Measurements of large (small) female in μm. Total L about 5100 (about 4000) (distended). Head L 546 (449), W 383 (321); eye L 138 (117), W 97 (87). Pronotum L 306 (209), W 566 (444); forewing L 2360 (1876). Pelta L 219 (163), W 250 (148). Tube L 439 (337), basal W 148 (117), apical W 71·5 (62). A1 to A7 L/W: 122(97)/87(71·5); 127(102)/56(50); 194(153)/67(61); 178(143)/66(62); 148(122·5)/52(48); 122(102)/50(46); 138(117)/40(36).

Length of setae: POS 330–332 (230–245), postocellars 168–189 (143–153). Prothoracic AA 62–72 (56–62), AM less than 25 (less than 25), ML 194–245 (about 150), PA 170–180 (128–143), EPIM 194–210 (about 150). SWS1 97–112 (66–77), SWS2 107–112 (77–87), SWS3 about 290 (150–225). B1(T9) 460–485 (408–423), B2(T9) about 500 (380–400). Anals about 330 (306–316).

MALE. Unknown.

Holotype ♀ (mac.), **India**: Darjeeling, Tiger Hill, on dead branches, 10.viii.1981 (*W. Suzuki*) (BMNH).

Paratypes. **India**: 1 ♀, collected with holotype; 3 ♀, data very similar to holotype, but 15.viii.1981 (SO; 2 ♀, BMNH).

COMMENTS. In the long postocellar setae, which are longer than half the length of the postocular setae, this species is distinct from all other members of the genus.

Holothrips ruidus (Ananthakrishnan)

(Figs 47–49)

Polyphemothrips ruidus Ananthakrishnan, 1969*a*: 305–306. Holotype ♀, INDIA (TNA) [examined].
Holothrips ruidus (Ananthakrishnan) Mound & Palmer, 1983: 94.

FEMALE (MACROPTERA). Bicolorous brown and yellow; head, pro- and mesothorax brown; metathorax and abdomen yellow, shaded with brown; A1 to A3 yellow, A4 to A6 brown with basal half yellowish, A7 brown to dark brown; all femora brown with pale apices, foretibiae yellow, mid and hindtibiae whitish yellow; tube yellow, with apex greyish brown; major setae yellowish. Head (Fig. 47) about 1·2 times as long as broad, dorsal surface not strongly elevated, sculpture weak at median portion; cheeks almost straight, serrate, with numerous warts; POS expanded at apex. Mouth-cone short, not pointed. Prothoracic ML shorter than AA. B1(T2–T8) and B2(T3–T6 and T8) weakly expanded, B1(T9) nearly pointed, B2(T7 and T9) sharply pointed at apex. Tube (Fig. 48) about 0·7 times as long as head, slightly narrowed at basal third and near apex, surface smooth.

MATERIAL EXAMINED

India: holotype ♀, Kallar, 1200′, Nilgiris, on fungus infested twigs, 9.ii.1969 (*T. N. Ananthakrishnan*) (TNA).

COMMENTS. In the shape of the head, foretarsal tooth, prothorax and tube, this species resembles four Asian species which are newly described in this paper: *curvidens*, *ryukyuensis*, *tibialis* and *unicolor*. However, *ruidus* can easily be distinguished from these four species by the seventh antennal segment in which the morphological seventh and eighth segments are completely fused with no suture between them (Fig. 49).

According to the original description, the holotype female was collected at '1200′, Nilgiris', although '1700′, Nilgiris' is written on the label of the holotype.

Holothrips ryukyuensis sp. n.

(Figs 62–64)

FEMALE (MACROPTERA). Colour brown; basal third of A3, foretibiae and basal half of tube somewhat paler; forewings generally shaded with pale grey; major setae yellowish.

Head (Fig. 62) 1·25 times as long as broad, dorsal surface not strongly elevated, distinctly sculptured except median portion; cheeks almost straight, gradually narrowed towards base, corrugated; POS long and slender, almost half length of head or longer, sharply pointed at apex. Eyes 0·28–0·30 times as long as head. Antennae 1·87–1·95 times as long as head; A7 (Fig. 64) with a reduced suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum well developed, about 1·6 times as broad as long, sculptured laterally, with strong median line; major setae sharply pointed at apex, AM minute. Forewings each with 20–23 DC; SWS sharply pointed at apex, SWS3 longer than twice length of SWS2. All lateral major setae (B1 and B2) on tergites pointed at apex. Tube (Fig. 63) 0·70–0·74 times as long as head, 2·3–2·4 times as long as basal width, constricted at basal third, surface smooth. Anal setae almost as long as tube or a little shorter than tube.

Measurements of holotype female in μm. Total L about 3500 (distended). Head L 387, W 311; eye L 107, W 87. Pronotum L 280, W 449; forewing L 1570. Tube L 270, basal W 117, apical W 51. A1 to A7 L(W): 92(71); 87(51); 122(61); 130(61); 120(56); 112(51); 115(43).

Length of setae: POS 184–189. Prothoracic AA 123–133, AM 10–15, ML 128–133, PA 128–133, EPIM 92–117. SWS1 61–69, SWS2 71–76, SWS3 158–188. B1(T9) 275–280, B2(T9) 280–285. Anals 255.

MALE (MACROPTERA). Colour and structure very similar to female. Head 1·18 times as long as broad; pronotum 1·4 times as broad as long; forefemora more enlarged; sternal reticulated areas present in S6 and S7; tube 0·77 times as long as head.

Measurements of paratype male in μm. Total L about 3400 (distended). Head L 332, W 283; eye L 97, W 77. Pronotum L 337, W 469; forewing L 1470. Tube L 255, basal W 105, apical W 50. A1 to A7 L(W): 77(61); 77(45); 117(56); 122(57); 109(51); 112(43); 107(36).

Length of setae: POS 188–209. Prothoracic AA 168–184, AM about 20, ML 163–174, PA 97–153, EPIM 107–117. SWS1 66–71, SWS2 87–102, SWS3 205–209. B1(T9) 255–281, B2(T9) 66–77. Anals 224–230.

Holotype ♀ (mac.), **Japan**: Ryukyu Is, Okinawa I., Yona, on dead *Quercus* leaves, 11.v.1972 (*S. Okajima*) (SO).

Paratypes. **Japan**: 1 ♂, collected with holotype; 1 ♀, Ryukyu Is, Iriomote I., Mt Tedou, on dead leaves of ever-green tree, 19.vi.1972 (*S. Okajima*) (SO).

COMMENTS. This species may be related to *ruidus* and its relatives, and is very similar to *unicolor* described below from West Malaysia. The differences between them are discussed under the latter species. From the other related species, it can be distinguished by the pointed lateral setae (B1 and B2) on all the abdominal tergites.

***Holothrips sakimurai* sp. n.**

(Figs 75–77, 83)

FEMALE (MACROPTERA). Colour very similar to *pictus*, but tube paler, lemon yellow.

Head (Fig. 75) 1·15 times as long as broad, dorsal surface sculptured laterally, not strongly elevated; cheeks weakly rounded, slightly constricted near base; POS expanded at apex, 0·33–0·35 times as long as head; postocellar setae much longer than diameter of ocellus, but very slender. Eyes slightly prolonged on ventral surface. Antennae 1·93–1·98 times as long as head; A7 (Fig. 77) with complete or nearly complete suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum 1·97–2·20 times as broad as long, weakly sculptured posteriorly; major setae expanded at apex, PA and EPIM subequal in length. Epimeral suture usually incomplete or nearly complete, sometimes complete. Forewings each with 7–9 DC; SWS expanded at apex. Foretarsal tooth directed forwards. Pelta (Fig. 83) bell-shaped, micro-pores absent. B1(T2–T8) and B2(T3–T6 and T8) expanded at apex, B1(T9) and B2(T7 and T9) sharply pointed at apex. Tube (Fig. 76) slightly swollen at middle, 0·67 times as long as head, about 2·1 times as long as basal width, surface smooth. Anal setae longer than tube.

Measurements of holotype female in μm. Total L about 2700 (distended). Head L 290, W 253; eye dorsal L 73–76, ventral L 87–90. Pronotum L 153, W 301; forewing L 986. Pelta L 115, W 153. Tube L 193, basal W 92, apical W 41. A1 to A7 L(W): 56(51); 66(38); 97(43); 92(45); 82(41); 76(38); 93(31).

Length of setae: POS 97–100. Prothoracic AA about 60, AM 57–62, ML about 60, PA ?, EPIM 95–100. SWS1 52, SWS2 67, SWS3 ?. B1(T9) 198, B2(T9) 198. Anals 220–230.

MALE. Unknown.

Holotype ♀ (mac.), **Hawaii**: Oahu, Helemano, 1100′, on *Diospyros* sp., foliage beating, 25.iv.1955 (*K. Sakimura*) (BMNH).

Paratypes. **Hawaii**: 1 ♀, Oahu, Palikea, 2800′, on *Urera* sp., foliage beating, 12.i.1948 (*K. Sakimura*) (SO); 1 ♀, Oahu, Honolulu, St Louis Heights, 800′, on fallen tree (shady area), 12.vi.1977 (*K. Sakimura*) (K. Sakimura collection): 1 ♀, Kauai, Koloa, on fallen twigs, 10.iv.1951 (*K. Sakimura*) (USNM); 1♀, Hawaii, Hilo Coast, Kolekole Beach Par, sweeping, 19.x.1983 (*D. M. Lasalle*) (Ewart collection).

Comments. The type-specimens including the holotype are all more or less damaged. The colour of the holotype and three paratypes is unnatural, due to long storage in AGA solution. However, one paratype female listed above from Hawaii I. has good colour but is somewhat crushed by the cover slip.

This species resembles *indicus* from India in coloration, antennal segmentation and shape of the tube. However, it can be distinguished by the following features: eyes slightly prolonged on ventral surface; mouth-cone shorter, not pointed; pelta without any micro-pores; tube slightly swollen at middle, longer than 0·6 times as long as head. From the other bicolorous species related to *indicus*, e.g. *pictus*, *andamanensis* and *speciossissimus*, it can easily be distinguished by the complete suture between the morphological seventh and eighth antennal segments, the absence of micro-pores on the pelta, and the shape of the tube.

Holothrips sawadai sp. n.

(Figs 133–135)

Female (macroptera). Colour and general structure very similar to *pictus*. Head (Fig. 133) 1·14 times as long as broad; eyes 0·28–0·30 times as long as head; antennae 1·80–1·85 times as long as head; pronotum 1·65–1·70 times as broad as long; forewings each with 10–13 DC; pelta (Fig. 135) bell-shaped, with a pair of micro-pores, reticulation more or less distinct; tube (Fig. 134) somewhat heavier than that of *pictus*, slightly constricted at basal third and apex, 0·79–0·82 times as long as head, about 2·4 times as long as basal width, surface sculptured with polygonal reticulation.

Measurements of holotype female in μm. Total L about 3000 (distended). Head L 296, W 260; eye L 82–87, W 73–79. Pronotum L 198, W 326; forewing L 1060. Pelta L 122, W 513. Tube L 235, basal W 97, apical W 41. A1 to A7 L(W): 61(56); 66(38); 87(46); 87(45); 77(38); 73(35); 87(30).

Length of setae: POS about 80. Prothoracic AA 50–55, AM 40–45, ML about 60, PA 66–68, EPIM 70–75. SWS1 50–56, SWS2 60–62, SWS3 66–70. B1(T9) 215, B2(T9) 240–245. Anals 205–220.

Holotype ♀ (mac.), **Singapore**: Macritchie Park, on dead leaves, 22.vii.1976 (*S. Okajima*) (BMNH).

Paratypes. **Singapore**: 1 ♀, data very similar to holotype, but on dead branches, 3.viii.1976 (SO); 1 ♀, City, on dead twigs, 15.i.1979 (*L. A. Mound*) (BMNH). **West Malaysia**: 1 ♀, Tapah, on dead leaves, 28.vii.1976 (*S. Okajima*) (SO).

Non-paratypic material. **West Malaysia**: 1 ♂, Genting Highlands, 30 ml. E. of Kuala Lumpur, 4500′, on dead wood and leaves, 28.ix.1973 (*L. A. Mound*) (BMNH). **Java**: 1 ♀, 2 ♂, Bogor Gardens, on dead twigs, 26.x.1973 (*L. A. Mound*) (BMNH).

Comments. This species is very similar to *pictus* in general appearance. However, it has the tube distinctly reticulate, although in *pictus* this is smooth. The female and three males listed above as non-paratypic material are almost identical, but the male from West Malaysia has a somewhat darker head, and the specimens from Java have shorter tubes.

The specific name of this species is dedicated to Prof. Hiromasa Sawada, Laboratory of Entomology, Tokyo University of Agriculture.

Holothrips schaubergeri (Priesner) comb. n.

(Figs 146, 147)

Trichothrips schaubergeri Priesner, 1920: 86–87. Holotype ♀, Austria (SMF) [not examined].
Trichothrips (Abiastothrips) schaubergeri Priesner; Priesner, 1925: 153.
Abiastothrips schaubergeri (Priesner) Priesner, 1927: 556.
Cratothrips priesneri Bagnall, 1933: 658. Holotype ♀, Austria (BMNH) [not examined].
Bolothrips lativerticis Post, 1961: 141–143. Holotype ♀, U.S.A. (CAS) [examined].

Female (macroptera). Colour brown to dark brown; A3 yellowish, shaded with brown at apical half, A4 to A6 with yellowish bases; wings shaded with greyish brown, but bases and extreme apices colourless, major setae yellowish. Head (Fig. 146) almost as long as broad, or a little broader, inter-antennal projection

broad due to small antennal sockets; cheeks weakly rounded; antennae about 1·8 times as long as head; A7 with a complete suture between MA7 and MA8. Mouth-cone rather pointed. Pelta bell-shaped, with a pair of micro-pores. POS and SWS expanded at apex; B1(T2–T8) and B2(T3, T4 and T8) expanded, B2(T5) weakly expanded or blunt, B1(T9) and B2(T6, T7 and T9) sharply pointed at apex. Tube (Fig. 147) straight-sided, about 0·7 times as long as head, surface smooth.

MATERIAL EXAMINED

France: 1 ♀, Montpellier, on *Pinus halepensis*, 4.vi.1958 (*A. Bournier*) (SO). **U.S.A.**: holotype ♀ of *lativerticis*, Oregon, Hood River County, Herman Creek, in hollow twigs, 31.i.1946 (*R. L. Post*) (CAS).

COMMENTS. This is only the species widespread in the Holarctic Region. However, its distribution in North America is limited to north-western U.S.A., although it is widely distributed in Europe. There is a possibility that the North American population originated from Europe.

The inter-antennal projection of this species is exceptionally broad, but this tendency is also found in *australis*, which is intermediate between other members of the genus and *schaubergeri*. It cannot be distinguished satisfactorily from other members of *Holothrips*.

Holothrips semiflavus (Moulton)

Agnostothrips semiflavus Moulton, 1947: 173. Holotype ♀, NEW GUINEA (CAS) [examined].
Holothrips semiflavus (Moulton) Mound & Palmer, 1983: 94.

FEMALE (MACROPTERA). Colour brown; head and pterothorax somewhat yellowish, prothorax a little darker; forefemora yellowish brown, mid and hindfemora greyish brown; foretibiae yellowish, mid and hindtibiae clear yellow; A1 to A4 yellowish brown, A3 and A4 darkened apically; A5 to A7 dark brown. Head 1·28 times as long as broad, dorsal surface sculptured posteriorly; cheeks slightly swollen behind eyes, widest across just behind eyes, strongly constricted behind middle, with several small warts; POS long, blunt or knobbed at apex; A7 with a reduced suture between MA7 and MA8. Prothoracic major setae and SWS blunt or knobbed at apex; foretibiae each with an apical tubercle. B2(T9) nearly pointed at apex, all other lateral setae including B1(T9) weakly knobbed at apex; tube 0·76 times as long as head, weakly constricted at apex, surface smooth; anal setae shorter than tube.

MATERIAL EXAMINED

New Guinea: holotype ♀, Maffin Bay, vi.1944 (*E. S. Ross*) (CAS).

COMMENTS. This species was described from a unique female. In the shape of the head, forefemora and prothorax, it resembles *ruidus* and its relatives, but can be distinguished by a combination of the following features: foretibiae each with an apical tubercle; dorsal surface of head sculptured posteriorly; B1(T9) weakly knobbed at apex.

Holothrips setosus sp. n.

(Figs 111–114, 119, 120)

FEMALE (MACROPTERA). Colour brown; anterior half of head tinged with yellow; all femora brown, concolorous with thorax, paler apically, all tibiae and tarsi whitish yellow; A1 and A2 brown, almost concolorous with body, A3 to A7 brown to dark brown, slightly darker than A1 and A2; abdomen pale brown to brown, gradually darkened posteriorly, but segment IX more or less paler than segment VIII, tinged with yellow; tube yellow in basal half, pale greyish brown in apical half; wings shaded with pale brown; major setae yellowish.

Head (Fig. 119) 1·25 times as long as broad, broadest across cheeks just behind eyes, dorsal surface distinctly sculptured, elevated as a roof at posterior two-thirds; cheeks weakly emarginate; POS weakly expanded at apex; postocellar setae well developed, longer than diameter of ocellus. Eyes small, shorter than one-fourth length of head. Antennae about 2·3 times as long as head; A7 (Fig. 114) longer than A3, with a reduced suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum (Fig. 113) 2·65 times as broad as long, anterior margin emarginate and shallowly V-shaped, weakly sculptured posteriorly; AM short and pointed at apex, other major setae weakly expanded at apex. Metascutum (Fig. 111) with fine reticulation, with a series of 13 setae in holotype (30–40 μm in length). Forewings each with 8–9 DC; SWS weakly expanded at apex. Foretarsal tooth (Fig. 112) minute. Pelta bell-shaped, weakly sculptured, micro-pores absent. WRS on T7 minute and simply curved. B1(T9) and B2(T4–T7 and T9) sharply pointed, B2(T3) very weakly expanded, B1(T2–T8) and B2(T8) expanded at apex. Tube (Fig. 120) smoothly narrowed apically at apical half, 0·74 times as long as head, 2·42 times as long as basal width, surface smooth. Anal setae shorter than tube.

Measurements of holotype female in μm. Total L 2780 (distended). Head L 318, W 255; eye L 61, W 76·5. Pronotum L 117, W 311; forewing L 1113. Pelta L 111, W 163. Tube L 235, basal W 97, apical W 51. A1 to A7 L(W): 66(58·6); 71·4(42·3); 122(46); 117(51); 102(46); 97(43·4); 132·6(35·7).

Length of setae: POS 91–100. Prothoracic AA ?, AM 30–36, ML about 110, PA 102–106, EPIM 102–108. SWS1 46, SWS2 77–82, SWS3 100–105. B1(T9) 239–243, B2(T9) 235. Anals 178–182.

MALE. Unknown.

Holotype ♀ (mac.), **Philippines**: Mindanao, Mt Apo, Agko, *c.* 1300 m, on dead leaves of ever-green tree, 30.vii.1979 (*S. Okajima*) (BMNH).

COMMENTS. This species is somewhat similar to *angulus* from West Malaysia, but it can easily be distinguished by the following features: anterior half of head tinged with yellow; A3 and A4 brown; A7 longer than A3; B2(T4–T7 and T9) sharply pointed. Moreover, the metascutum of *setosus* has a series of more than 10 setae, in which feature it differs from all the other species of the genus.

Holothrips soror (zur Strassen) **comb. n.**

(Figs 144, 145)

Abiastothrips soror zur Strassen, 1974: 111–120. Holotype ♀, MADEIRA Is (SMF) [2 ♀, 1 ♂ paratypes examined].

FEMALE (MACROPTERA AND MICROPTERA). Colour brown to dark brown; A2 yellow, shaded with brown basally, A3 yellow, A4 yellow, shaded with brown apically, A5 yellowish at basal half, brown at apical half, A6 and A7 brown, extreme base of A6 yellowish; tibiae with somewhat paler extreme apices. Head (Fig. 144) 1·15–1·20 times as long as broad; cheeks very weakly rounded, gradually narrowed towards base; POS usually pointed at apex, sometimes blunt; antennae 1·7–1·8 times as long as head; A7 usually with a complete suture between MA7 and MA8; mouth-cone rather pointed. Epimoral suture usually complete, sometimes incomplete; pelta broadly bell-shaped or rather triangular, with a pair of micro-pores. Posterior pair of WRS on T2 and T5 developed in macroptera, others in macroptera and all of microptera reduced. B1(T2–T8) and B2(T3–T5 and T8) weakly expanded or blunt, but B1(T6 and T7) and B2(T4 and T5) sometimes pointed, B1(T9) and B2(T6, T7 and T9) sharply pointed. Tube (Fig. 145) straight-sided, 0·70–0·77 times as long as head, surface smooth.

MATERIAL EXAMINED

Canary Is: 1 ♀, 1 ♂ paratypes, La Palma, Brena Alta, 360 m, on dried twigs of *Castanea sativa*, 2.v.1970 (*R. zur Strassen*) (SMF). **Madeira Is**: 1 ♀ paratype, Ribeiro de Santa Luzia (São Roque), on dead twigs of *Salix canariensis*, 18.iv.1967 (*R. zur Strassen*) (SMF).

COMMENTS. In the following combination of features, this species is distinct in the genus: body uniformly brown to dark brown, including tibiae; A2 yellowish, much paler than A1; head 1·15–1·20 times as long as broad; mouth-cone pointed; tube straight-sided; pelta with a pair of micro-pores.

Holothrips speciossissimus (Karny)

(Figs 127–129)

Nesothrips speciossissimus Karny, 1920: 42. Holotype ♂, AUSTRALIA (Naturhistoriska Riksmuseet, Stockholm) [not examined].
Adelothrips speciossissimus (Karny) Mound, 1974: 16.
Holothrips speciossissimus (Karny) Mound & Palmer, 1983: 95.

MATERIAL EXAMINED

Australia: 2 ♀, Queensland, Mission Beech, Clump Point, on dead branches, 21.vii.1968 (*L. A. Mound*) (BMNH).

COMMENTS. The present author has not examined the holotype male. However, the two females listed above were compared with the holotype by Mound (1974: 16). These females have weakly expanded median setae (B1) on the ninth abdominal tergite. In *pictus*, most similar to this species, these setae are sharply pointed at the apex.

These two females are somewhat different in coloration from each other. One is bicolorous yellow and brown, the other is darker, almost uniformly dark brown. However, the present author has not found any other differences between them.

Holothrips stannardi (Ananthakrishnan)

Polyphemothrips stannardi Ananthakrishnan, 1972: 431–432. Holotype ♀, INDIA (TNA) [not examined].
Holothrips stannardi (Ananthakrishnan) Mound & Palmer, 1983: 95.

Unfortunately, the present author has not studied this species. According to the original description, it differs from the other members of the genus in a combination of the following features: A3 yellowish, the remaining segments dark brown; head longer than 1·2 times as long as broad; tibiae brown; B2(T9) knobbed at apex. However, the status of this species is still not clear.

Holothrips storki sp. n.

(Figs 22–25)

FEMALE (MACROPTERA). Colour dark brown; all tarsi and extreme apices of tibiae paler; antennae concolorous with body, but basal half of A3 yellowish; wings shaded with pale brown, major setae yellowish.

Head (Fig. 22) 1·14 times as long as broad, dorsal surface not strongly elevated, sculptured laterally; cheeks subparallel, weakly rounded; POS about 0·3 times as long as head, blunt, at least not sharply pointed at apex. Eyes a little shorter than 0·3 times as long as head. Posterior ocelli almost in contact with eyes. Antennae about twice length of head; A7 (Fig. 24) with a reduced suture between MA7 and MA8. Mouth-cone short and not pointed. Pronotum about 2·2 times as broad as long, sculptured posteriorly; major setae blunt at apex. Forefemora moderately enlarged. Forewings each with 14 DC; SWS blunt at apex. Pelta (Fig. 25) bell-shaped, sculptured weakly, micro-pores absent. All B1 and B2 setae on tergites blunt at apex, at least not sharply pointed. Tube (Fig. 23) somewhat heavy, a little shorter than head, about 2·5 times as long as basal width, surface almost smooth, but with some longitudinal wrinkles. Anal setae much shorter than tube.

Measurements of holotype female in μm. Total L about 300 (distended). Head L 306, W 268; eye L 87, W 77–80. Pronotum L 162, W 362; forewing L 1250. Pelta L 143, W 178. Tube L 296, basal W 117, apical W 51. A1 to A7 L(W): 64(56); 64(40); 97(50); 109(48); 97(41); 77(37); 82(26).

Length of setae: POS 87–91. Prothoracic AA 40–50, AM 34–37, ML about 40, PA 90–92, EPIM 87–93. SWS1 53–56, SWS2 81–83, SWS3 133–145. B1(T9) 209–224, B2(T9) 260. Anals 200–204.

MALE. Unknown.

Holotype ♀ (mac.), **Brunei**: Bukit Sulang, nr Lamunin, fogging (*Shorea jahovensis*), 20.viii.–10.x.1982 (*N. Stork*) (BMNH).

COMMENTS. This species is described from the unique female, and its relationships are still unknown. The long tube is somewhat similar to those of the *apoensis*-group.

Holothrips subtilis (Ananthakrishnan)

(Figs 154, 155)

Polyphemothrips subtilis Ananthakrishnan, 1972: 430–431. Holotype ♀, INDIA (TNA) [examined].
Holothrips subtilis (Ananthakrishnan) Mound & Palmer, 1983: 95.

FEMALE (MACROPTERA). Colour brown to dark brown; head dark brown, thorax somewhat paler than head, abdomen brown, tube yellow with dark base and apex; A1 yellow, tinged with brown, A2 to A4 yellow, A5 yellow with brownish apex, A6 brown with yellow base, A7 brown; foretibiae brownish yellow, mid and hindtibiae brown with paler bases and apices; forewings with brownish shade at apical two-thirds; major setae yellowish. Head (Fig. 154) about 1·2 times as long as broad; POS sharply pointed at apex; a pair of anteocellar setae well developed, about half length of POS. A7 with a complete suture between MA7 and MA8. Prothoracic ML the longest, sharply pointed at apex, AA, PA and EPIM expanded at apex. Pelta bell-shaped, with a pair of micro-pores. B1(T8) and B2(T8) blunt or expanded at apex, all other B1 and B2 setae on tergites sharply pointed. Tube (Fig. 155) weakly constricted at basal third and apex, 0·67 times as long as head, 2·3 times as long as basal width. Anal setae longer than tube.

MATERIAL EXAMINED

India: holotype ♀, Kodaikanal, on dry twigs, 5.viii.1970 (*T. N. Ananthakrishnan*) (TNA).

COMMENTS. The original description of this species states that B1 and B2 setae on the ninth tergite are equal

in length. However, the holotype female has B2 setae much longer than B1 setae on this tergite. By the long anteocellar setae, this species can easily be distinguished from all the other members of the genus.

Holothrips tibialis sp. n.

(Figs 53–57, 68)

Female (macroptera). Bicolorous yellow and brown; head yellowish brown; prothorax dark brown, mesothorax pale brown, metathorax yellow, shaded with brown anteriorly; abdomen pale brown to brown, darkened posteriorly; tube brownish yellow, with dark base and apex; forefemora yellowish brown, with paler apices, mid and hindfemora brown, paler apically; foretibiae yellow, mid and hindtibiae whitish yellow; A1 to A4 yellow, A4 shaded with brown apically, A5 to A7 brown to dark brown, A5 with yellowish base; wings shaded with pale brown, with bases transparent; major setae yellowish.

Head (Fig. 53) 1·21 times as long as broad, dorsal surface not elevated, strongly sculptured laterally; cheeks corrugated, weakly rounded, gradually narrowed towards base; POS long, longer than one-third length of head, blunt or weakly expanded at apex. Eyes rounded, 0·27 times as long as head. Antennae (Fig. 55) about twice length of head; A7 with a reduced suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum (Fig. 68) about 1·5 times as broad as long, strongly sculptured anteriorly and laterally; major setae very weakly expanded or blunt, sometimes nearly pointed, at least not sharply pointed, but AM minute and pointed. Forewings each with 10 DC; SWS blunt at apex. Foretibiae with a subapical small hump at inner surface (Fig. 56), foretarsal tooth stout. Pelta (Fig. 57) irregularly hat-shaped, sculptured weakly, micro-pores absent. B1(T7 and T9) nearly pointed at apex, other B1 and B2 setae on tergites blunt or weakly expanded at apex. Tube (Fig. 54) 0·64 times as long as head, about twice as long as basal width, constricted at basal third and apex, dorsal surface smooth, ventral surface weakly sculptured with transverse rows of striae. Anal setae a little longer than tube.

Measurements of holotype female in μm. Total L about 2700 (distended). Head L 296, W 244; eye L 81, W 66. Pronotum L 235, W 348; forewing L 1176. Pelta L 112, W 118. Tube L 189, basal W 92, apical W 44. A1 to A7 L(W): 76(53); 71(40); 96(50); 92(51); 87(44); 87(43); 82(36).

Length of setae: POS 111–113. Prothoracic AA about 50, AM 32–34, ML 50–55, PA 62–66, EPIM 70–80. SWS1 36–37, SWS2 46–47, SWS3 70–73. B1(T9) 158–160, B2(T9) 195–200. Anals 200–205.

Male (macroptera). Colour very similar to macropterous female. Head 1·27 times as long as broad; eyes about 0·3 times as long as head; pronotum about 1·4 times as broad as long; sternal reticulated areas absent; tube about 0·6 times as long as head, about 1·9 times as long as basal width.

Measurements of paratype male in μm. Total L 2550 (distended). Head L 275, W 216; eye L 82, W 62. Pronotum L 240, W 332; forewing L 1150. Pelta L 117, W 133. Tube L 163, basal W 86, apical W 41. A1 to A7 L(W): 64(49); 66(36); 85(45); 87(45); 85(39); 86(37); 79(31).

Length of setae; POS 117–120. Prothoracic AA 46–50, AM shorter than 25, ML 47–52, PA 65–68, EPIM 70–73. SWS1 33–35, SWS2 38–40, SWS3 51–69. B1(T9) 152–154, B2(T9) 43–45. Anals 178–189.

Holotype ♀ (mac.), **Sulawesi**: nr Rantepao, Pedamaran, on dead twigs with leaves, 10.viii.1984 (*S. Okajima*) (BMNH).

Paratypes. **Sulawesi**: 2 ♂, same data as holotype (SO; 1 ♂, BMNH).

Non-paratypic material. **Sulawesi**: 1 ♂, same data as holotype (SO).

Comments. In the shape of the head, thorax, forelegs and tube, this species is undoubtedly related to *ruidus* and its relatives. However, this species has a subapical hump at the inner surface of the foretibiae.

The non-paratypic male listed above was collected with the type-series but is somewhat darker in coloration, although otherwise similar in structure.

Holothrips titschacki (Priesner)

Docessissophothrips titschacki Priesner, 1928: 53–54. Holotype ♀, South Africa (Hamburg) [destroyed].
Docessissophothrips titschacki var. *debilis* Priesner, 1928: 54. Holotype ♀, South Africa (SMF) [examined].
Holothrips titschaki (sic!) (Priesner) Mound & Palmer, 1983: 95.

Material examined

South Africa: holotype ♀ of var. *debilis*, Capland, Port Elisabeth, 15.xii.1898 (*H. Brauns*) (SMF).

Comments. According to the original description, var. *debilis* is not distinct from the nominate form of *titschacki*. Moreover, the holotype female of var. *debilis* is very similar to *luteus* which is known also from

South Africa. These are indistinguishable from each other, and there is every possibility that *luteus* is a synonym of *titschacki*. Unfortunately, however, the type of *debilis* is in somewhat poor condition, and the present author cannot compare them closely.

Holothrips torajanus sp. n.

(Figs 26–28)

FEMALE (MACROPTERA). Colour dark brown; A3 with pale extreme base; apices of tibiae a little paler, tarsi somewhat yellowish; wings each with a pale brown longitudinal stripe; major setae yellowish.

Head (Fig. 26) about 1·2 times as long as broad, broadest across cheeks at posterior third, dorsal surface not strongly elevated, sculptured weakly; cheeks slightly rounded, weakly constricted subbasally; POS well developed, longer than one-third length of head, blunt at apex, at least not sharply pointed. Eyes about one-third length of head. Antennae about 2·2 times as long as head; A7 (Fig. 28) with a reduced suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum 1·68 times as broad as long, with a weak median line, sculptured weakly; major setae blunt or weakly expanded at apex, AM setae comparatively long, but shorter than AA. Foretarsal tooth short and blunt. Forewings each with 26–28 DC; SWS blunt at apex. Metanotal median pair of setae well developed, about 80 μm. Pelta bell-shaped, with distinct reticulation, micro-pores absent. All B1 and B2 setae on tergites blunt, at least not sharply pointed. Tube (Fig. 27) almost straight-sided, 1·14–1·20 times as long as head, about 3·0 times as long as basal width, surface almost smooth. Anal setae much shorter than tube.

Measurements of holotype female in μm. Total L about 5200 (distended). Head L 362, W 305; eye L 120–123, W 87–89. Pronotum L 271, W 454; forewing L 1823. Pelta L 183, W 229. Tube L 412, basal W 137·5, apical W 60. A1 to A7 L(W): 87(73); 92(47); 132(54); 142(53); 119(45); 102(36); 118(32).

Length of setae: POS 130–140. Prothoracic AA about 80, AM 62–66, ML 100, PA 165–168, EPIM 140–145. SWS1 77–82, SWS2 20, SWS3 150–200. B1(T9) 255–265, B2(T9) 275–285. Anals 260–300.

MALE (MACROPTERA). Colour very similar to female. Head 1·23 times as long as broad; pronotum about 1·3 times as broad as long; foretarsal tooth well developed, forefemora enlarged; forewings each with 30–31 DC; abdominal reticulated areas present on S5 to S7, that on S7 weakly developed; tube 1·08 times as long as head, about 2·8 times as long as basal width.

Measurements of paratype male in μm. Total L about 3600 (distended). Head L 321, W 260; eye L 112–113. Pronotum L 321, W 428; forewing L 1700. Pelta L 163, W 188. Tube L 346, basal W 122, apical W 56. A1 to A7 L(W): 81(69); 82(41); 127(51); 133(50); 119(43); 97(38); 108(27).

Length of setae; POS 137. Prothoracic AA 107–110, AM 35–50, ML 142–148, PA 158–163, EPIM 135–145. SWS1 97–100, SWS2 138–142, SWS3 194–204. B1(T9) 255–265, B2(T9) 71–82. Anals 275–290.

Holotype ♀ (mac.), **Sulawesi**: nr Rantepao, Pedamaran, on dead twigs with leaves, 10.viii.1984 (*S. Okajima*) (BMNH).

Paratypes. **Sulawesi**: 38 ♀, 15 ♂, collected with holotype; 200 ♀, 70 ♂, Puncak, 31 km W. of Palopo, on dead leaves, 16, 19.viii.1984 (*S. Okajima*) (SO; several ♀, ♂, BMNH, SMF, TNA).

COMMENTS. This species is somewhat similar to those of the *apoensis*-group in having a blunt foretarsal tooth, a long tube which is much longer than the head, and short maxillary stylets which do not reach the posterior margins of the eyes. However, it differs from the *apoensis*-group as follows: body larger; head broadest across cheeks at posterior third; maxillary stylets close together, only a little separated from each other; metanotal median pair of setae well developed.

Holothrips torosus sp. n.

(Figs 69–71, 81)

FEMALE (MACROPTERA). Colour brown; abdomen paler than thorax; foretibiae brown, foretarsi brownish yellow, mid and hindtibiae whitish yellow; tube yellowish brown, with dark apex; antennae brown, A7 and apices of A4 to A6 dark brown; wings weakly shaded with pale brown; major setae yellowish.

Head (Fig. 69) 1·37–1·38 times as long as broad, dorsal surface sculptured posteriorly, not strongly elevated; cheeks almost straight, subparallel, rough and slightly swollen near base; hind pair of anteocellar setae well developed, much longer than diameter of ocellus (45–56 μm in holotype), blunt at apex; POS about one-third length of head, expanded at apex. Eyes small and rounded, shorter than 0·3 times as long as head. Antennae about twice length of head; A3 almost as long as A5, shorter than A4; A7 (Fig. 71) without suture between MA7 and MA8. Mouth-cone short, not pointed; maxillary stylets short, not

reaching level of POS. Pronotum well developed, 1·34–1·38 times as broad as long, sculptured anteriorly and laterally, with a strong median line; major setae expanded at apex. Probasisternum well developed. Forewings each with 18–24 DC; expanded at apex. Fore legs well developed, forefemora moderately enlarged, foretarsal tooth stout. Pelta (Fig. 81) much broader than long, micro-pores absent. B1(T2–T8) and B2(T3–T6) expanded at apex, B2(T8) blunt or weakly expanded, B1(T9) and B2(T7 and T9) sharply pointed. Tube (Fig. 70) slightly narrowed at basal third and apex, about 0·7 times as long as head, about 2·5 times as long as basal width, ventral surface with transverse rows of weak sculpture, dorsal surface almost smooth. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L 3900 (distended). Head L 408, W 296; eye L 108–110, W 81–83. Pronotum L 377·5, W 505; forewing L 1560. Pelta L 166, W 280. Tube L 280, basal W 110, apical W 58. A1 to A7 L(W): 107(71); 92(56); 112(66); 133(66); 122(56); 112(54); 122(41).

Length of setae: POS 133–138. Prothoracic AA 77–87, AM 61–66, ML 107–110, PA 102–110, EPIM about 100. SWS1 61–64, SWS2 81–84, SWS3 97–100. B1(T9) 306, B2(T9) 300–306. Anals 270–280.

MALE. Unknown.

Holotype ♀ (mac.), **Singapore**: Macritchie Reservoir, on dead twigs, 14.i.1979 (*L. A. Mound*) (BMNH).

Paratypes. **Singapore**: 2 ♀, collected with holotype (BMNH).

COMMENTS. The three females comprising the type-series are in somewhat poor condition. The head shape of this species is unique in the genus, especially in its rounded eyes and cheeks. However, the shape of the prothorax, fore legs, pelta and tube are similar to those of *ruidus* and its relatives.

Holothrips typicus (Ananthakrishnan)

(Fig. 187)

Ischnothrips typicus Ananthakrishnan, 1967: 235. Holotype ♀, INDIA (TNA) [not examined].
Stinothrips typicus (Ananthakrishnan) Ananthakrishnan, 1969: 55.
Holothrips typicus (Ananthakrishnan) Mound & Palmer, 1983: 95.

Unfortunately, the present author has not studied the holotype female. However, five specimens collected from Taiwan listed below could not be distinguished from the original description of this species. These include a macropterous female and a micropterous male as follows.

FEMALE (MACROPTERA). Colour very similar to micropterous female, but pterothorax more or less darker, yellowish brown; wings hyaline. Eyes a little larger; forewings each with 11–13 DC; SWS expanded at apex; posterior pair of WRS short and rather straight.

MALE (MICROPTERA). Colour and structure very similar to micropterous female. Forefemora (Fig. 187) each with a well-developed tubercle just before middle of interior margin; sternal reticulated areas absent, at least not visible.

MATERIAL EXAMINED

Taiwan: 2 ♀ (including a microptera), 1 ♂, Pingtung Hsien, Kenting National Park, on grass, 22.v.1972 (*S. Okajima*); 2 ♀, data very similar to above, but 24.v.1972 (SO; 2 ♀, BMNH).

COMMENTS. This species is somewhat similar to *luteus* from South Africa in appearance, but is distinct from the latter in having short and pointed mid-vertex head setae.

Holothrips unicolor sp. n.

(Figs 65–67)

MALE (MACROPTERA). Colour brown to dark brown; head, prothorax, forefemora and tube dark brown; pterothorax, abdomen, mid and hindfemora brown; all tibiae pale brown, with pale apices; A1 and A4 to A7 brown to dark brown, A4 to A6 with bases a little paler, A2 and A3 yellowish, A3 with brown apex; wings shaded with pale brown; major setae yellowish.

Head (Fig. 65) 1·38 times as long as broad, dorsal surface not strongly elevated, sculptured laterally; cheeks almost straight, gradually narrowed towards base, corrugated; POS long, longer than half length of head, sharply pointed at apex. Eyes rounded, 0·28 times as long as head. Antennae 1·95–2·00 times as long as head; A7 with a reduced suture between MA7 and MA8. Mouth-cone short, not pointed. Pronotum about 1·4 times as broad as long, sculptured laterally, with a long and stout median line; major setae

sharply pointed at apex, AM minute. Forewings each with 16–20 DC; SWS sharply pointed at apex. Pelta (Fig. 67) hat-shaped, weakly sculptured, micro-pores absent; sternal reticulated areas absent; all B1 and B2 setae on tergites sharply pointed. Tube (Fig. 66) 0·70–0·73 times as long as head, 2·52–2·57 times as long as basal width, slightly constricted at basal third and apex. Anal setae almost as long as tube.

Measurements of holotype male in μm. Total L 2950 (distended). Head L 326, W 236; eye L 92, W 66–72. Pronotum L 275, W 382; forewing L 1300. Pelta L 112, W 148. Tube L 230, basal W 89, apical W 46. A1 to A7 L(W): 76·5(54); 77(46); 98(50); 102(48); 97(46); 97(41); 92(36).

Length of setae; POS 173–204. Prothoracic AA 122–132, AM about 15, ML 122–143, PA 132, EPIM 102–112. SWS1 66–70, SWS2 76–80, SWS3 153–158. B1(T9) 245–255, B2(T9) 61–66. Anals 220–224.

FEMALE. Unknown.

Holotype ♂ (mac.), **West Malaysia**: Tanah Rata, on dead branches, 24.vii.1976 (*S. Okajima*) (BMNH).
Paratype. **West Malaysia**: 1 ♂, collected with holotype (SO).

COMMENTS. This species is similar to *ruidus* and its relatives, and is most similar to *ryukyuensis* from Japan. However, it can be distinguished by the following features: head longer than 1·3 times as long as broad; ocelli small, 21–25 μm in diameter (30μm in *ryukyuensis*); tube uniformly dark brown; tibiae pale brown, with pale apices; sternal reticulated areas absent in male.

Holothrips yuasai (Kurosawa) **comb. n.**

(Figs 7, 188, 189, 196, 200)

Pseudosymphothrips yuasai Kurosawa, 1954: 134–135. Holotype ♂, JAPAN (National Institute of Agro-Environmental Science, Tsukuba, Japan) [examined].

FEMALE (MACROPTERA). Colour dark brown; A3 to A6 each with yellow base; major setae brownish yellow. Head (Fig. 188) 1·05–1·10 times as long as broad, cheeks weakly rounded, dorsal surface not strongly elevated; eyes 0·30–0·32 times as long as head; POS blunt or weakly expanded at apex, almost as long as eye or longer; suture between MA7 and MA8 incomplete, but nearly complete (sometimes complete) (Fig. 200); pelta (Fig. 196) bell-shaped, micro-pores absent; all B1 and B2 setae on tergites not sharply pointed, but blunt; tube (Fig. 189) very weakly constricted at basal third and apex, 0·80–0·82 times as long as head, about 2·4 times as long as basal width.

MATERIAL EXAMINED

Japan: holotype ♂, Tokyo, Mt Mitake, 24.vi.1928 (*H. Yuasa*) (National Institute of Agro-Environmental Science, Japan); many ♀, ♂ collected on dead leaves and branches from Honshu, Tsushima I. and Izu Is (SO; BMNH).

COMMENTS. This species is very similar to *hagai* in appearance. The differences between them are discussed under the latter species.

Holothrips yurikoae **sp. n.**

(Figs 72–74, 82)

FEMALE (MICROPTERA). Colour uniformly yellow; A3 a little brownish, A4 brownish yellow, more or less darker than A3, A5 and A6 brown with paler basal halves, A7 brown; extreme apex of tube shaded with pale grey; major setae hyaline.

Head (Fig. 72) 1·24 times as long as broad, dorsal surface sculptured laterally, slightly elevated; cheeks almost straight gradually, but weakly narrowed towards base; POS expanded at apex, 0·36 times as long as head. Eyes small. Antennae 1·84 times as long as head, surface of segments distinctly sculptured; A3 and A4 subequal in length; suture between MA7 and MA8 incomplete (Fig. 74). Mouth-cone short, not pointed. Pronotum comparatively small, almost twice as broad as long; epimeral suture incomplete; all major setae expanded at apex. Pelta (Fig. 82) rather triangular, much broader than long, micro-pores absent. B1(T9) and B2(T9) sharply pointed at apex, all other B1 and B2 setae on tergites expanded at apex; posterior pair of WRS well developed and sigmoid on T3 and T6, other WRS short and rather straight. Tube (Fig. 73) straight-sided, 0·67 times as long as head, about 2·0 times as long as basal width, surface smooth. Anal setae almost as long as tube.

Measurements of holotype female in μm. Total L 2780 (distended). Head L 306, W 247; eye L 56, W 56–57.

Pronotum L 168, W 337; forewing L 185–188. Pelta L 101, W 180. Tube L 204, basal W 104, apical W 47. A1 to A7 L(W): 66(56); 71(45); 92(46); 92(46); 78(41); 71(41); 83(34).

Length of setae: POS 108–110. Prothoracic AA 70–80, AM 74–77, ML about 80, PA 94–97, EPIM 85–90. B1(T9) about 190, B2(T9) 195. Anals 179–205.

MALE (MACROPTERA). Colour very similar to female. Head 1·22 times as long as broad; pronotum 1·76 times as broad as long, with a strong median line, epimeral suture nearly complete; forefemora more or less enlarged, foretarsal tooth stout; B2(T9) very weakly expanded; sternal reticulated areas present on S4 to S7, but very weak; tube 0·66 times as long as head, 1·65 times as long as basal width.

Measurements of paratype male in μm. Total L 2226 (distended). Head L 255, W 209; eye L 48–49, W 42–44. Pronotum L 168, W 296; forewing L 105–110. Pelta L 87, W 149. Tube L 168, basal W 102, apical W 42. A1 to A7 L(W): 56(48); 66(36); 82(41); 77(41); 65(37); 77(30·5).

Length of setae: POS about 85. Prothoracic AA 65–70, AM 62–67, ML about 70, PA 77–87, EPIM ?65. B1(T9) 173, B2(T9) 50–51. Anals 170–?.

Holotype ♀ (mic.). **Japan**: Kanagawa Pref., Miura-hantou, Jinmuji Forest, on dead branches, 10.xii.1983 (*S. Okajima*) (SO).

Paratype. **Japan**: 1 ♂, data very similar to holotype, but 4.xi.1985 (*S. Okajima*) (SO).

COMMENTS. This species may be closely related to some North American species, *acutus* (Stannard), *bratleyi* (Watson), *junctus* (Hood) and *xanthopus* (Hood), but it can be distinguished by a combination of following features: body yellow; antennal segments distinctly sculptured (Fig. 74); epimeral suture incomplete or nearly complete; B2(T7) expanded or very weakly expanded at apex, at least not sharply pointed.

The specific name is dedicated to the author's wife, Yuriko Okajima, for her warmhearted help in various ways.

Holothrips zimmermanni (Moulton)

Ischnothrips zimmermanni Moulton, 1944: 305–306. Holotype ♂, FIJI (Bernice P. Bishop Museum, Honolulu) [examined].

Holothrips zimmermanni (Moulton) Mound & Palmer, 1983: 95.

FEMALE AND MALE (MACROPTERA). Colour brown to dark brown, with posterior portion of metathorax and abdominal segment I clear yellow; forefemora dark brown, mid and hindfemora brown, with basal third yellowish; foretibiae brown, gradually lightened to yellow towards apex, mid and hindtibiae brown, a little paler than femora, with pale bases and apices; tube dark brown, with pale apex; A1 dark brown, almost concolorous with head, A2 yellow with dark base, A3 to A6 yellow, shaded with brown apically, A7 brown, more or less paler than head; wings hyaline at basal one-fourth, shaded with brown at apical three-fourths.

Head 1·5–2·0 times as long as broad, dorsal surface elevated, with very weak sculpture at posterior portion; cheeks almost straight, subparallel; POS longer than eye, sharply pointed at apex; suture between MA7 and MA8 reduced; maxillary stylets each with a single lateral loop in mouth-cone. Prothoracic AA, AM, ML and EPIM blunt at apex, but nearly pointed, PA sharply pointed at apex. Pelta very weak, sculpture invisible, micro-pores absent. B1(T8) blunt or weakly knobbed at apex, all other B1 and B2 setae on tergites sharply pointed. Tube short, straight-sided, 0·42–0·45 times as long as head, surface smooth; anal setae almost as long as tube.

MATERIAL EXAMINED

Fiji: holotype ♂, allotype ♀, Navai Mill, Tholo North. Viti Levu, 2500 ft, 15, 17.ix.1938 (*Zimmermann*) (B. P. Bishop Museum); 3 ♀, 1 ♂, Nandarivatu, Viti Levu, in scolytid gallery in young mahogany, viii.1955 (*B. A. O'Connor*) (BMNH).

COMMENTS. This species is somewhat similar to some *Docessissophothrips* species in having long and laterally looped maxillary stylets. However, typical *Docessissophothrips* species have a strongly elevated head and more or less developed mid-vertex (mid-dorsal) head setae, although *zimmermanni* has moderately elevated head and short mid-vertex head setae. The coloration of this species is unique in the genus.

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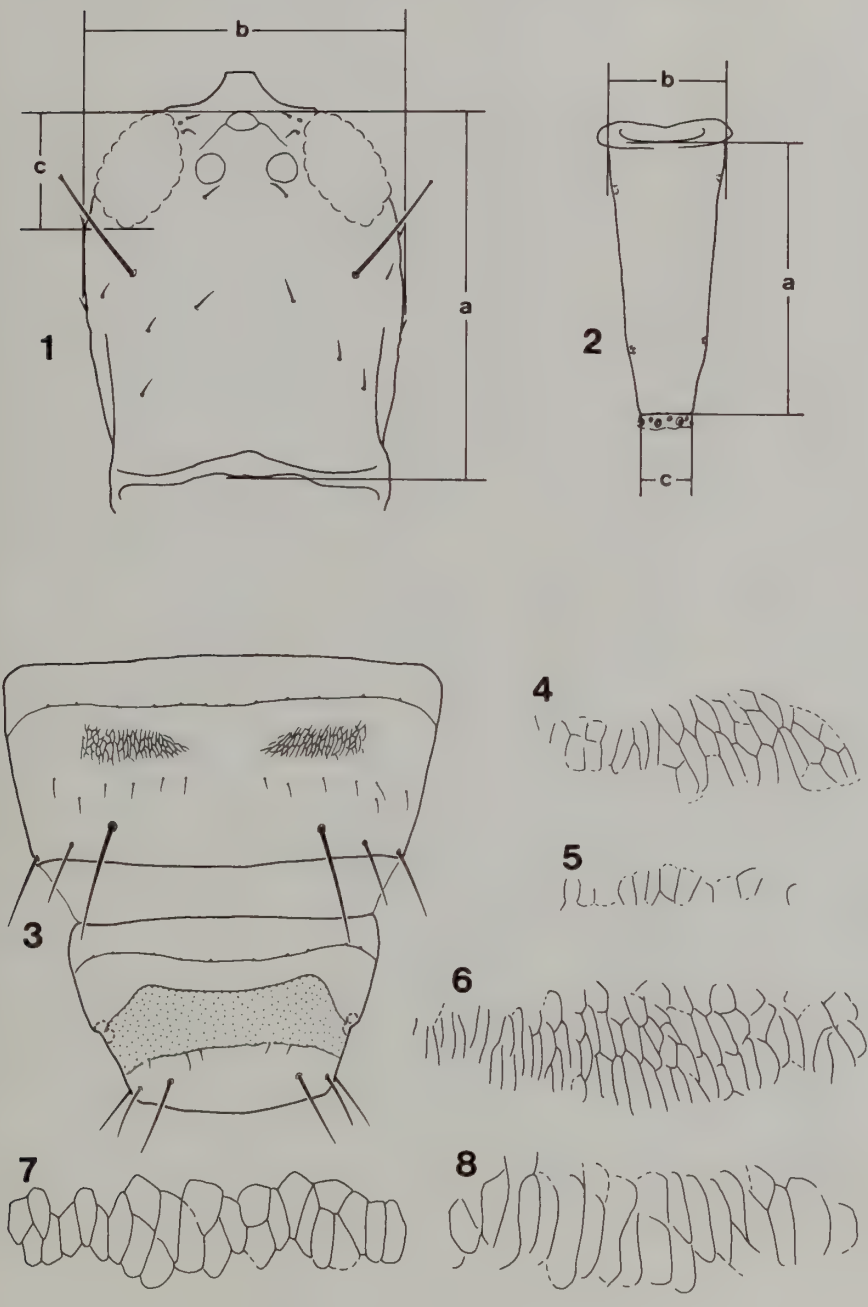
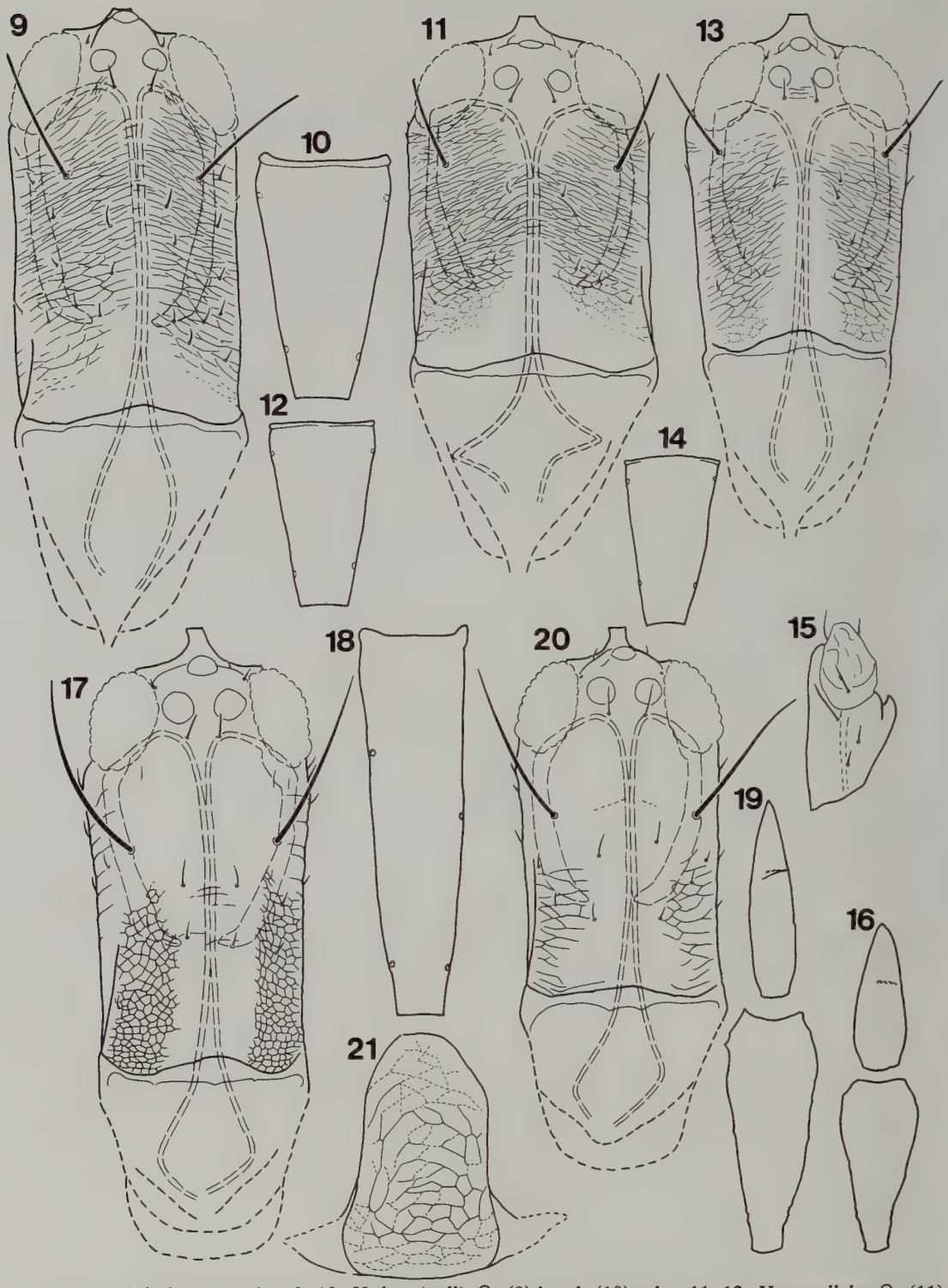
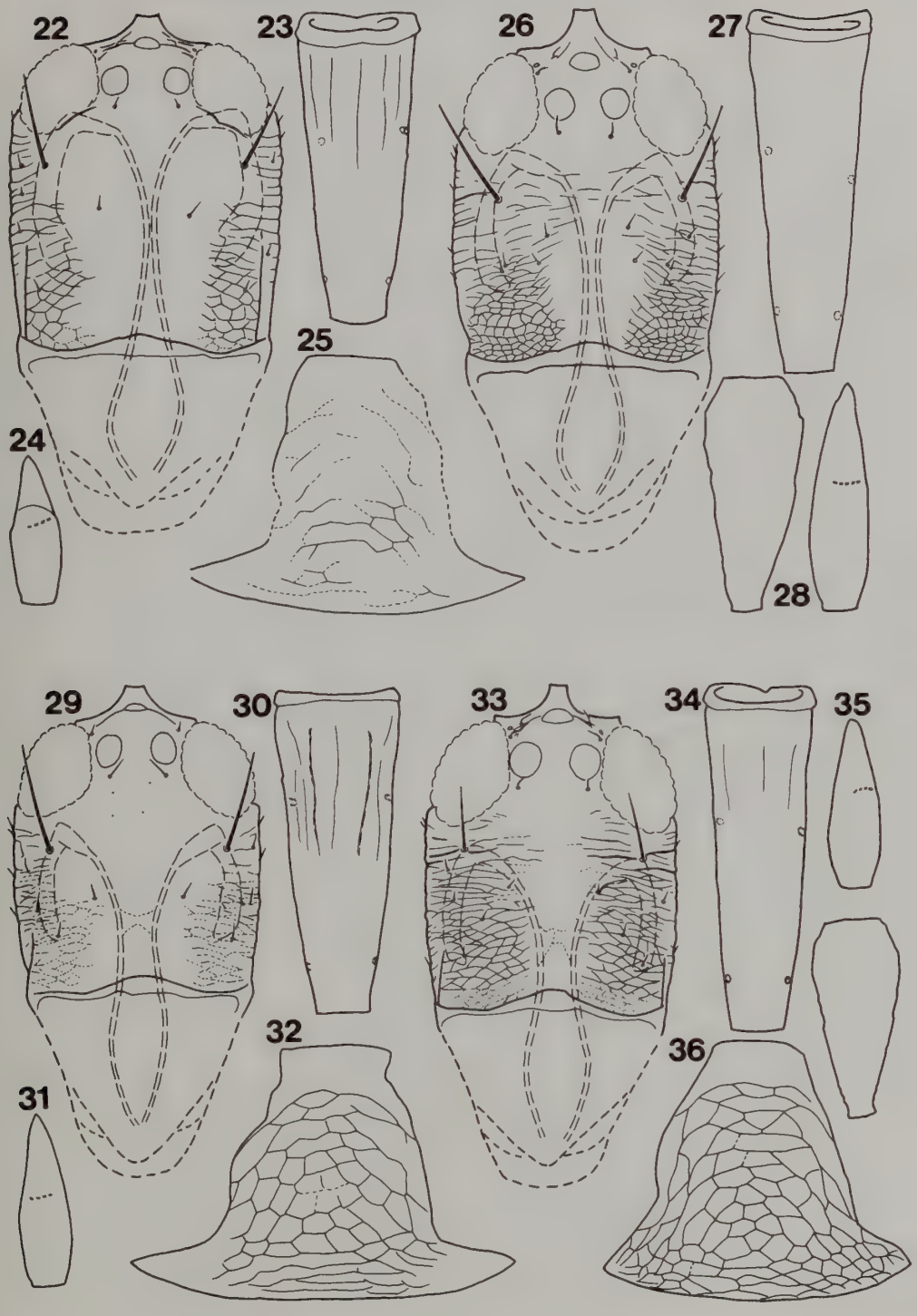


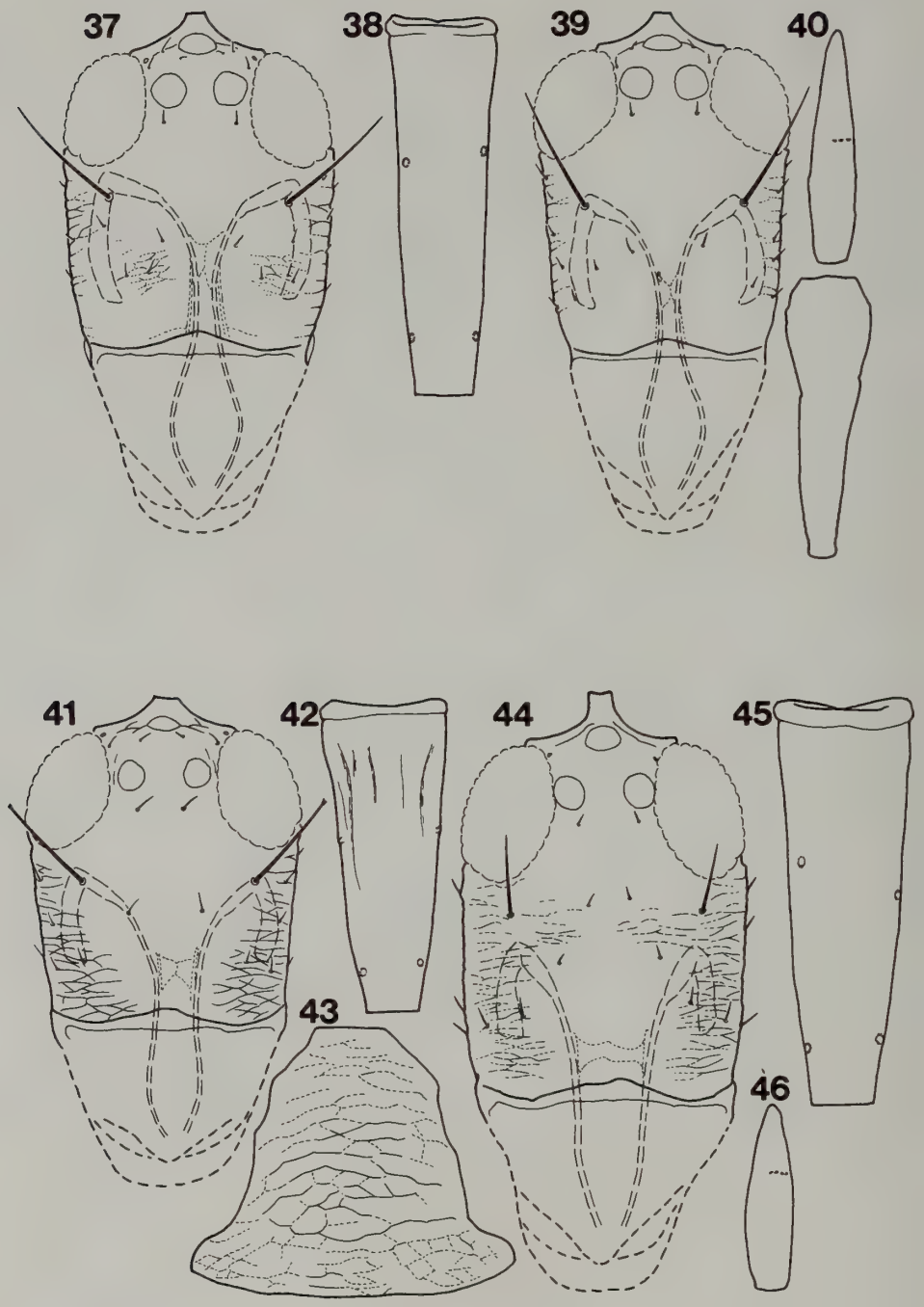
Figs 1–8 1, 2, Measurements standards: (1) head, a – length, b – width, c – eye length; (2) tube, a – length, b – basal width, c – apical width. 3, 4, males of *Hoplothrips* species: (3) *H. fungi*, sternites VII and VIII; (4) *H. semicaecus*, left portion of male sternal reticulated areas (S7). 5–8, left portions of male sternal reticulated areas of *Holothrips* species: (5) *H. peninsulae* (S6); (6) *H. mirandus* (S7); (7) *H. yuasai* (S7); (8) *H. ogasawarensis* (S7).



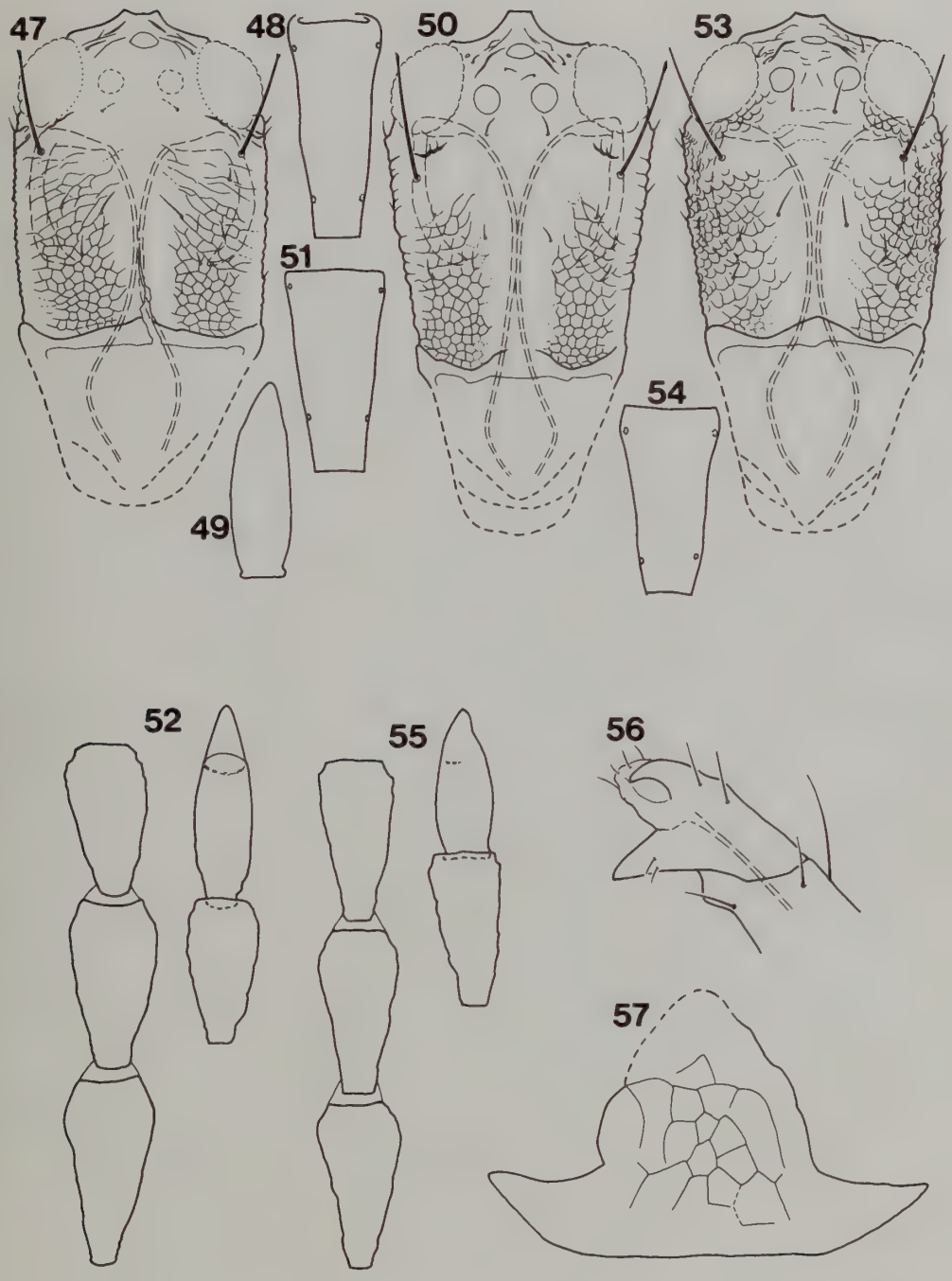
Figs 9–21 *Holothrips* species. 9, 10, *H. brevicollis* ♀: (9) head; (10) tube. 11, 12, *H. parallelus* ♀: (11) head; (12) tube. 13–16, *H. brevitubus* ♀: (13) head; (14) tube; (15) foretarsus; (16) antennal segments III and VII. 17–19, *H. nigripes* ♀: (17) head; (18) tube; (19) antennal segments III and VII. 20, 21, ? *H. mirandus* ♂ from Malaya: (20) head; (21) pelta.



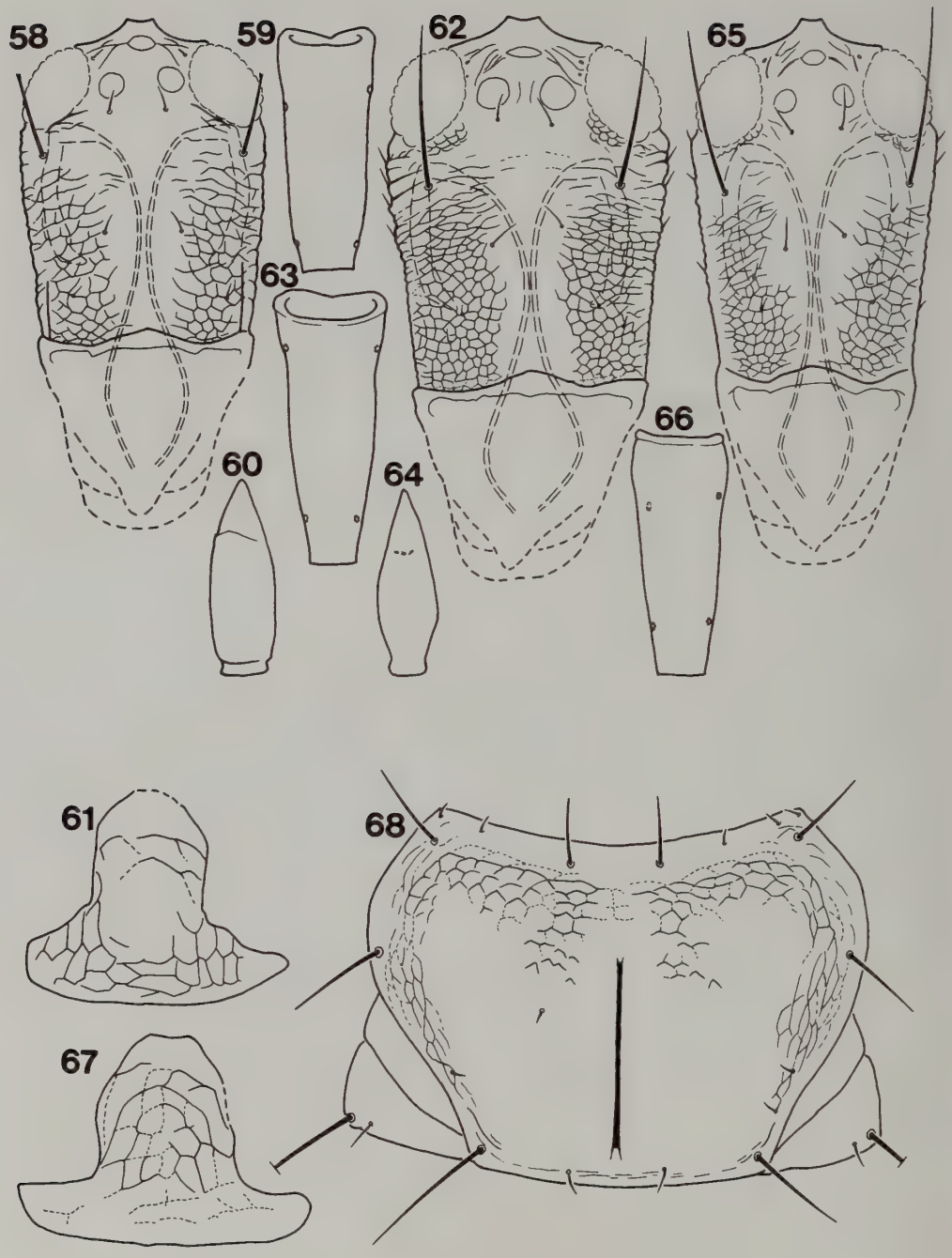
Figs 22–36 *Holothrips* species. 22–25, *H. storki* ♀: (22) head; (23) tube; (24) antennal segments VII; (25) pelta. 26–28, *H. torajanus* ♀: (26) head; (27) tube; (28) antennal segments III and VII. 29–32, *H. peninsulae* ♀: (29) head; (30) tube; (31) antennal segment VII; (32) pelta. 33–36, *H. apoensis* ♀: (33) head; (34) tube; (35) antennal segments III and VII; (36) pelta.



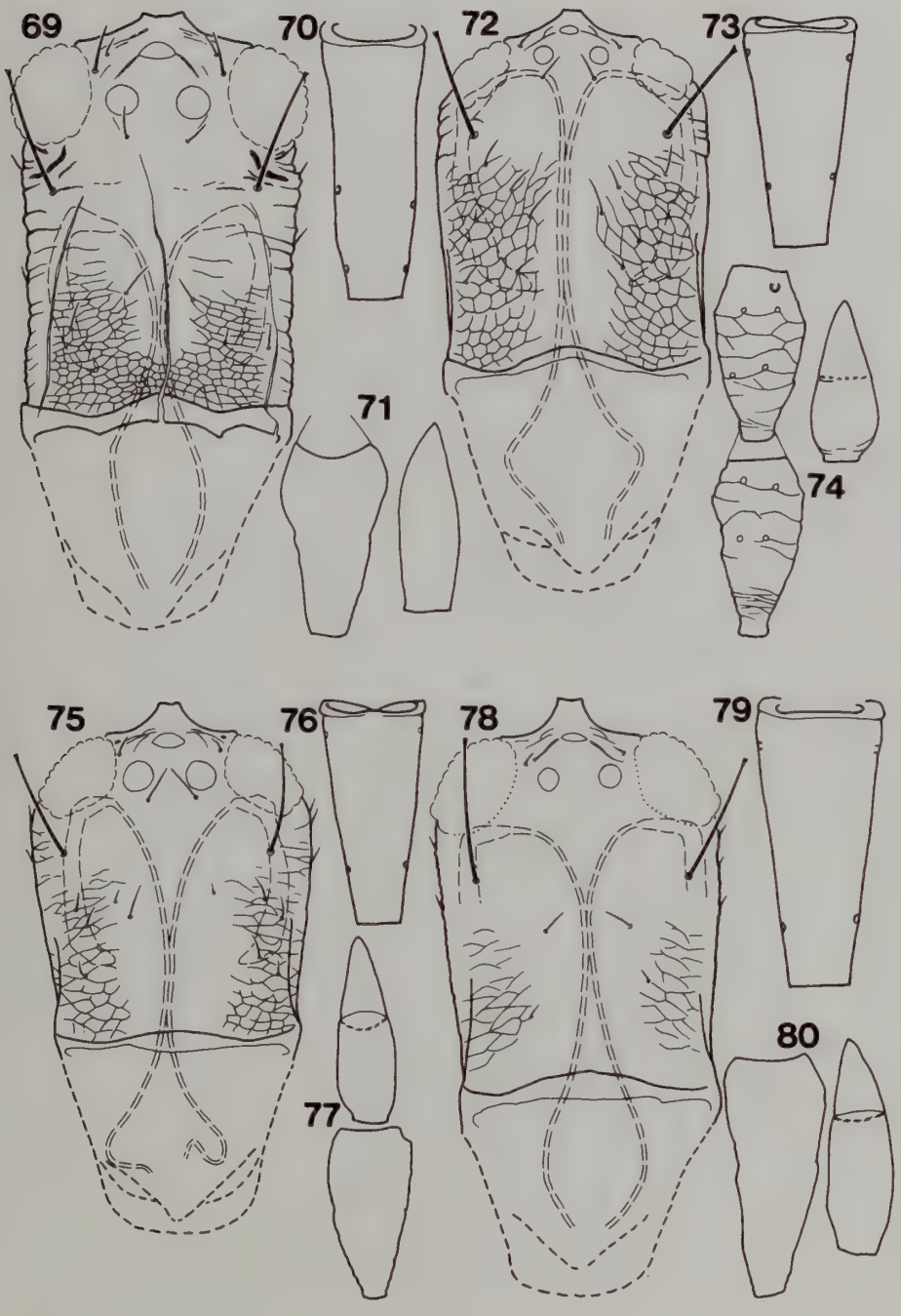
Figs 37–46 *Holothrips* species. 37–40, *H. flavus*: (37) head ♀; (38) tube ♀; (39) head ♂; (40) antennal segments III and VII ♀. 41–43, *H. armatus* ♂: (41) head; (42) tube; (43) pelta. 44–46, *H. maxillae* ♀: (44) head; (45) tube; (46) antennal segment VII.



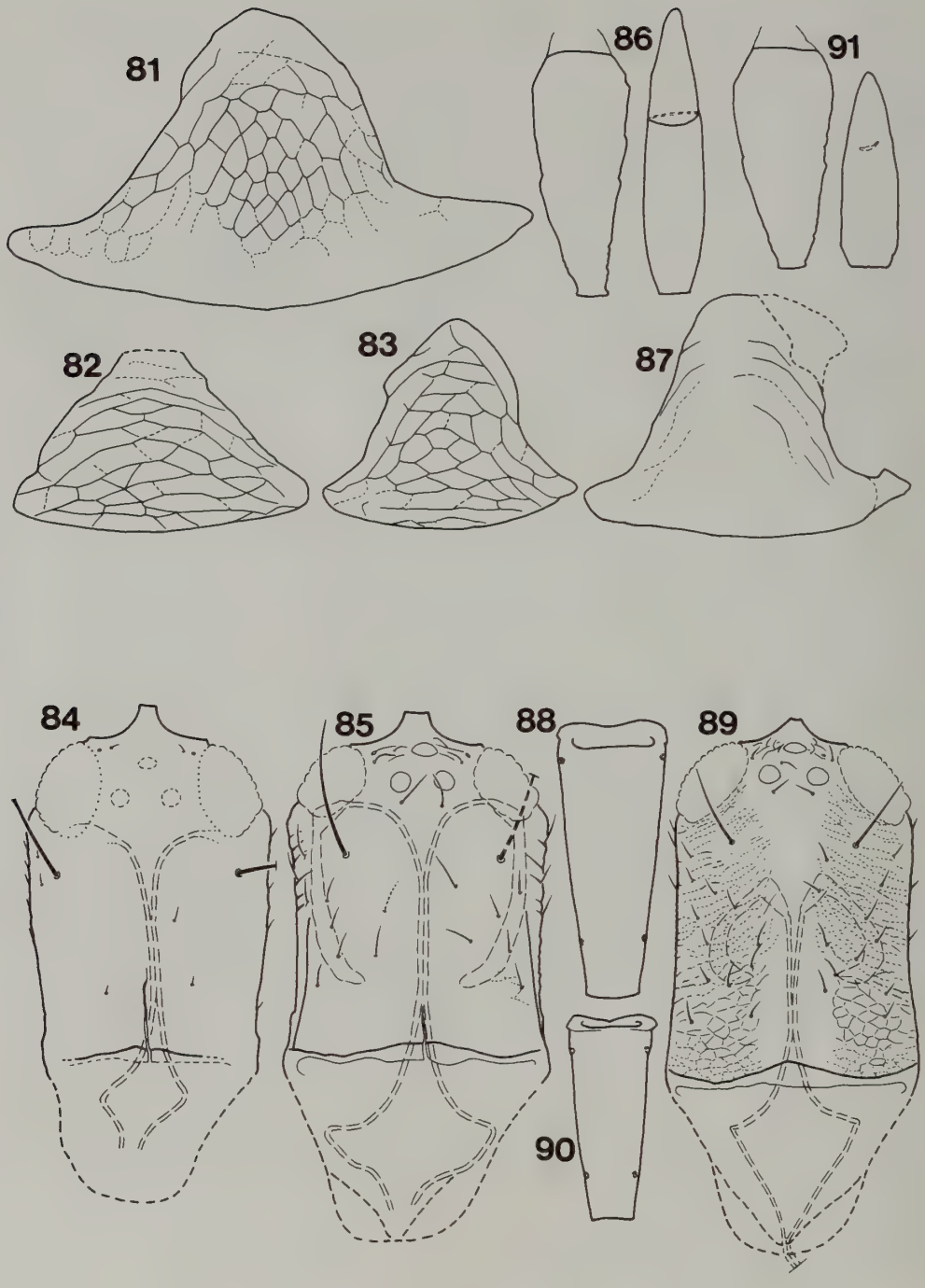
Figs 47–57 *Holothrips* species. 47–49, *H. ruidus* ♀: (47) head; (48) tube; (49) antennal segment VII. 50–52, *H. africanus* ♀: (50) head; (51) tube; (52) antennal segments III–VII. 53–57, *H. tibialis*: (53) head ♀; (54) tube ♀; (55) antennal segments III–VII ♀; (56) foretibia and tarsus ♂; (57) pelta ♀.



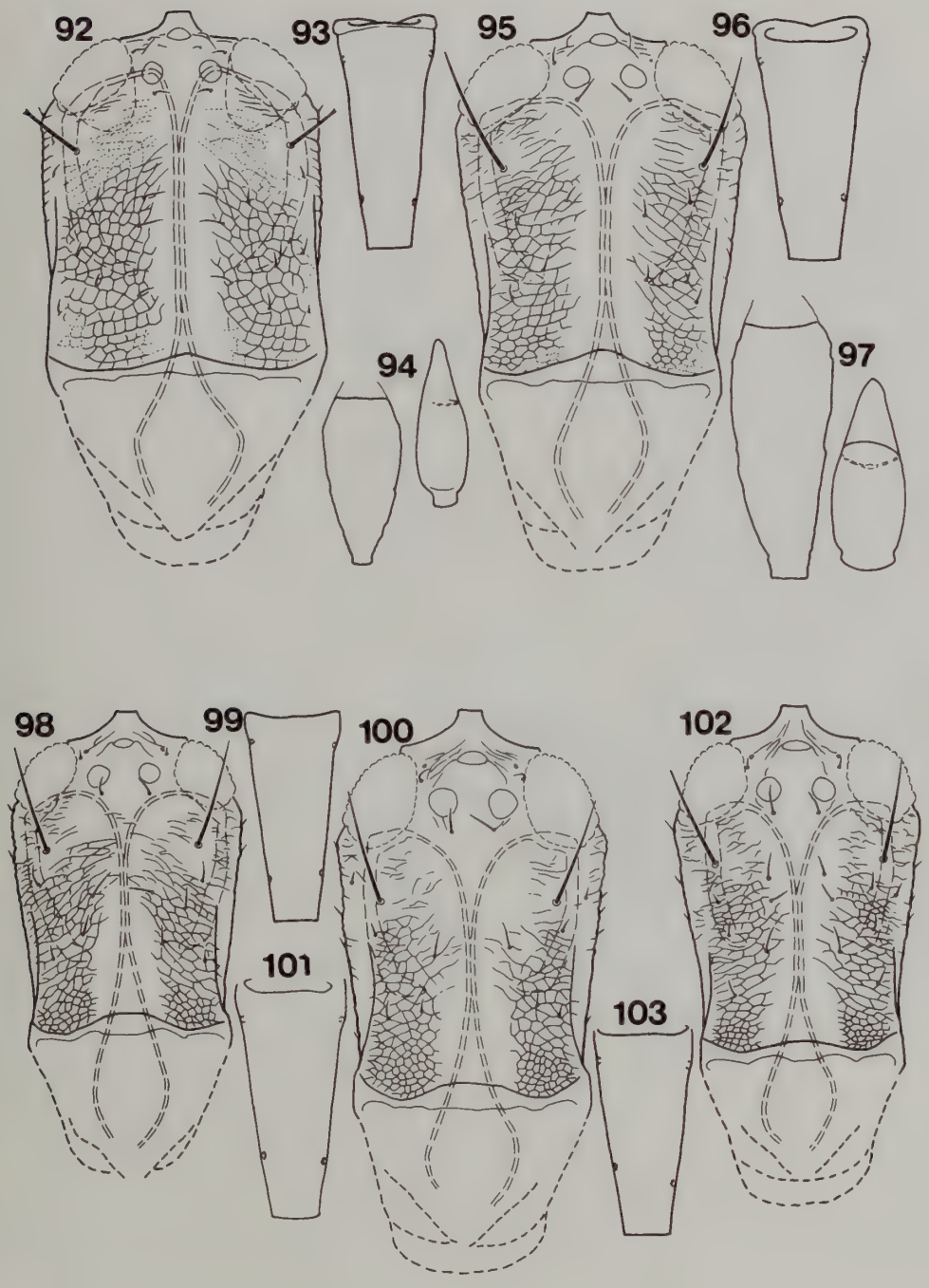
Figs 58–68 *Holothrips* species. 58–61, *H. curvidens* ♀: (58) head; (59) tube; (60) antennal segment VII; (61) pelta. 62–64, *H. ryukyuensis* ♀: (62) head; (63) tube; (64) antennal segment VII. 65–67, *H. unicolor* ♂: (65) head; (66) tube; (67) pelta. 68, *H. tibialis* ♀, prothorax.



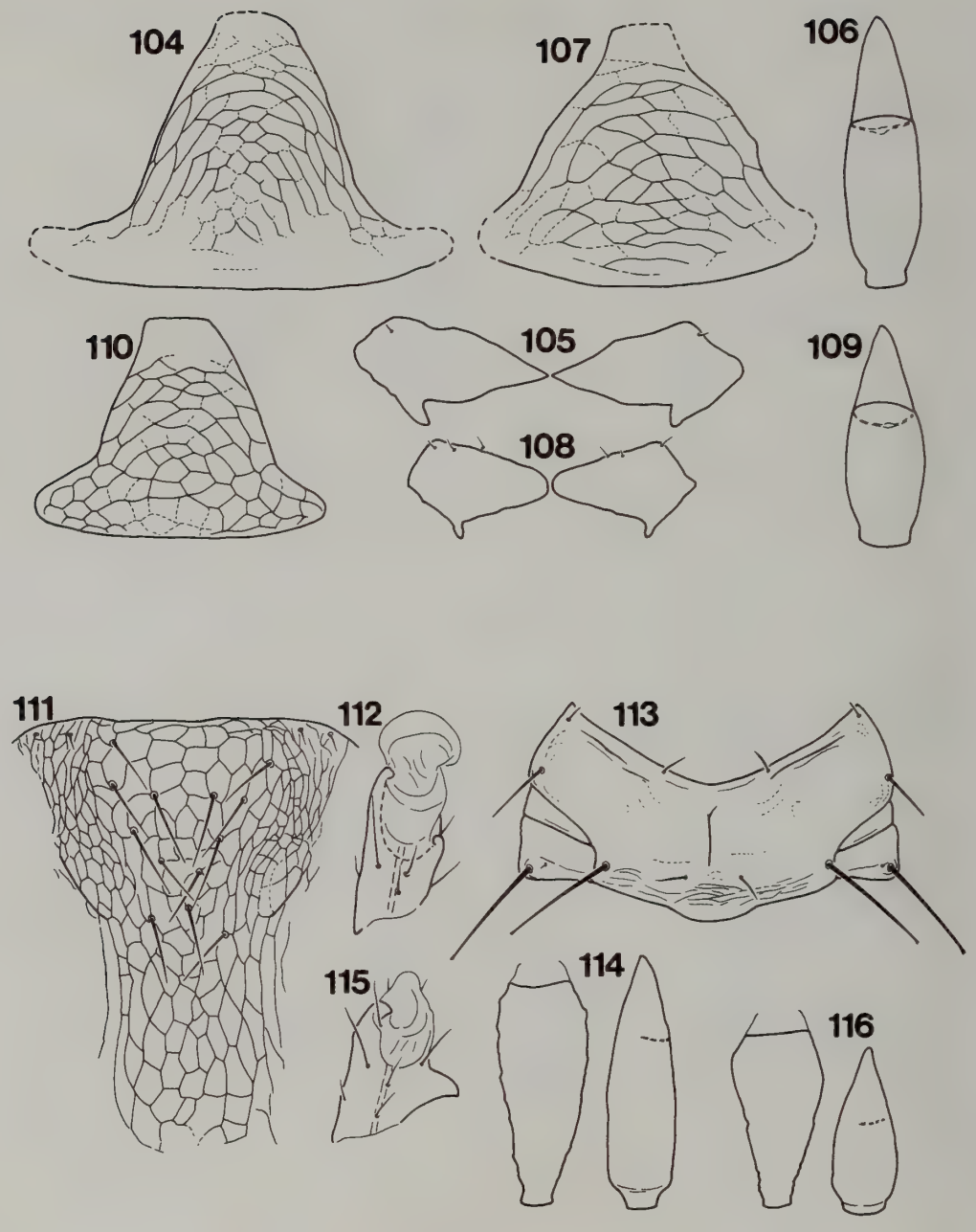
Figs 69–80 *Holothrips* species. 69–71, *H. torosus* ♀, (69) head; (70) tube; (71) antennal segments III and VII. 72–74, *H. yurikoae* ♀: (72) head; (73) tube; (74) antennal segments III, IV and VII. 75–77, *H. sakimurai* ♀: (75) head; (76) tube; (77) antennal segments III and VII. 78–80, *H. andrei* ♀: (78) head; (79) tube; (80) antennal segments III and VII.



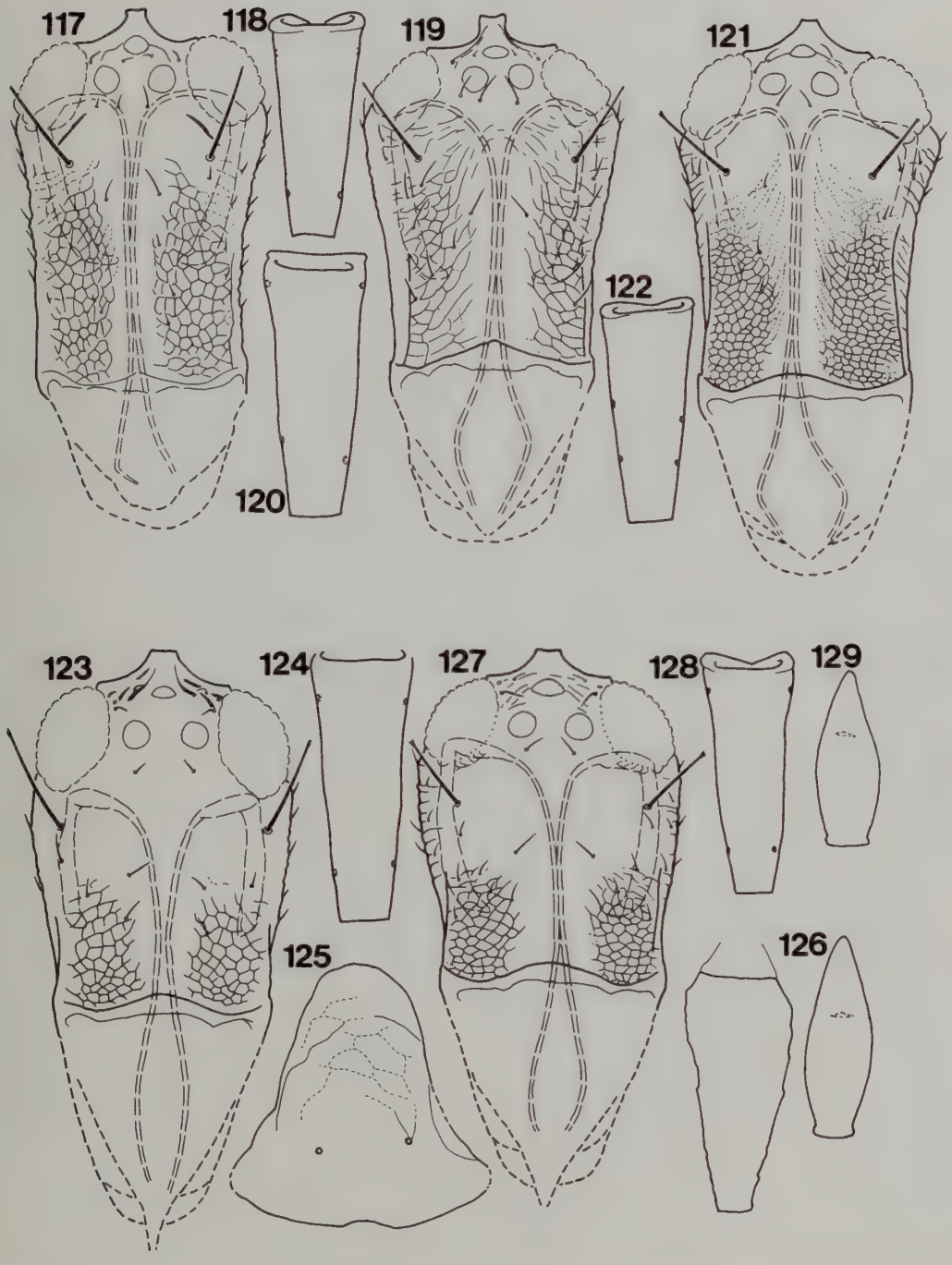
Figs 81–91 *Holothrips* species. 81–83, peltas: (81) *H. torosus*; (82) *H. yurikoae*; (83) *H. sakimurai*. 84, *H. citricornis* ♂, head. 85–88, *H. antennalis* ♀: (85) head; (86) antennal segments III and VII; (87) pelta; (88) tube. 89–91, *H. cephalicus* ♀: (89) head; (90) tube; (91) antennal segments III and VII.



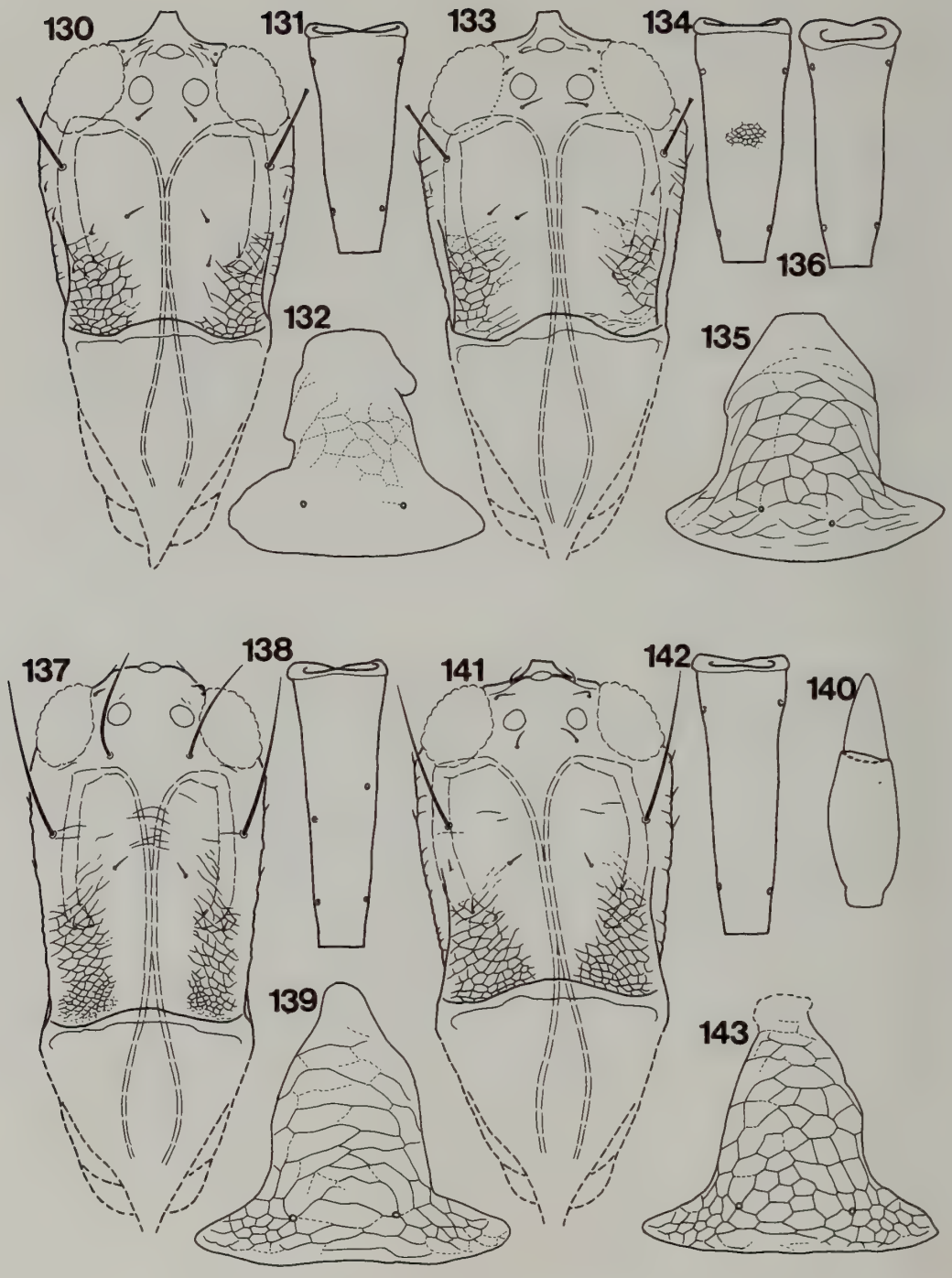
Figs 92–103 *Holothrips* species. 92–94, *H. oceanicus* ♀: (92) head; (93) tube; (94) antennal segments III and VII. 95–97, *H. okinawanus* ♀: (95) head; (96) tube; (97) antennal segments III and VII. 98, 99, *H. ogasawarensis* ♀: (98) head; (99) tube. 100, 101, *H. japonicus* ♀: (100) head; (101) tube. 102, 103, *H. latidentis* ♀: (102) head; (103) tube.



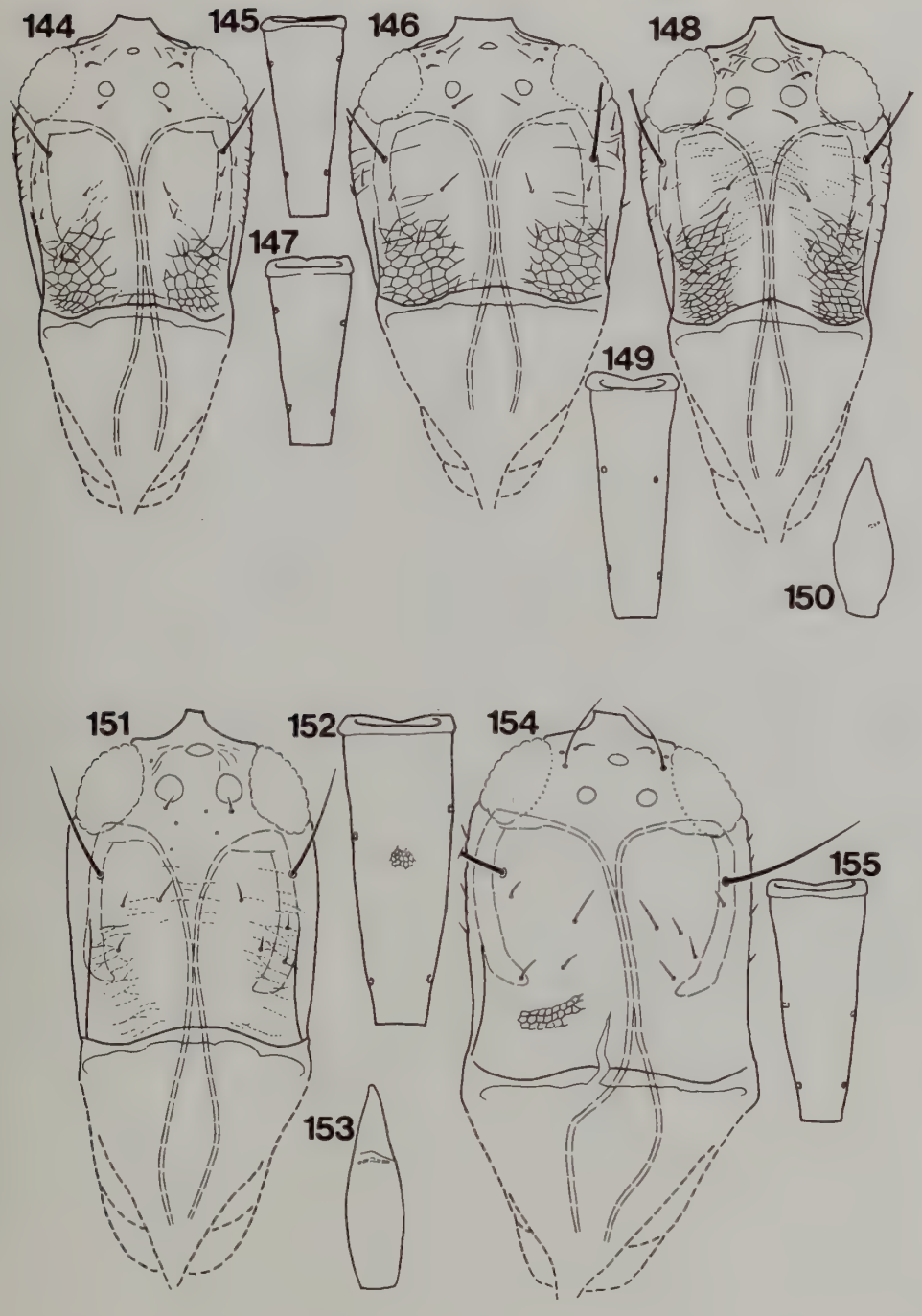
Figs 104–116 *Holothrips* species. 104–106, *H. japonicus* ♀: (104) pelta; (105) probasisternum; (106) antennal segment VII. 107–109, *H. latidentis* ♀: (107) pelta; (108) probasisternum; (109) antennal segment VII. 110, *H. oceanicus* ♀, pelta. 111–114, *H. setosus* ♀: (111) mesoscutum; (112) foretarsus; (113) prothorax; (114) antennal segments III and VII. 115, 116, *H. luminosus* ♀: (115) foretarsus; (116) antennal segments III and VII.



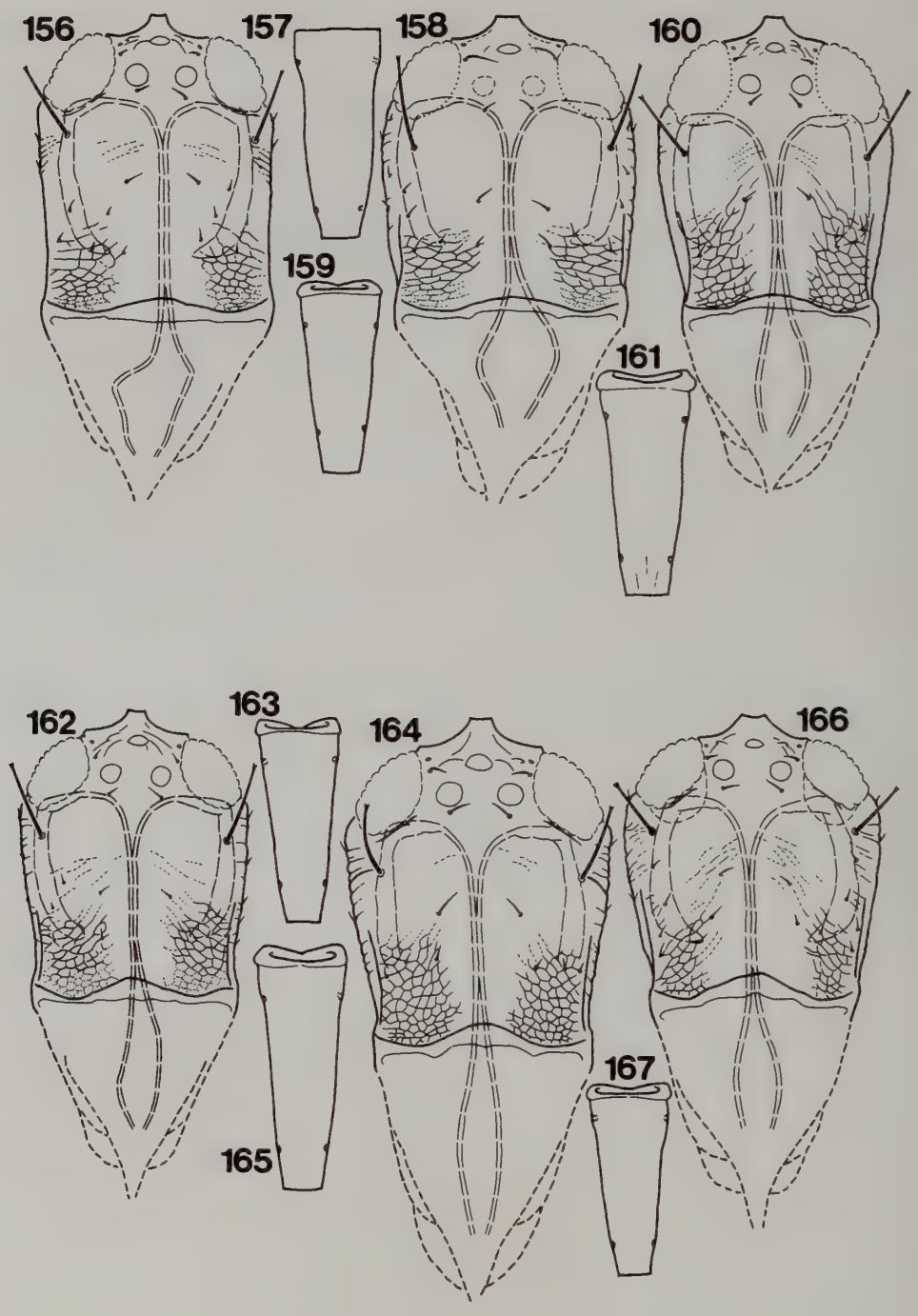
Figs 117–129 *Holothrips* species. 117, 118, *H. luminosus* ♀: (117) head; (118) tube. 119, 120, *H. setosus* ♀: (119) head; (120) tube. 121, 122, *H. angulus* ♀: (121) head; (122) tube. 123–126, *H. pulchellus* ♀: (123) head; (124) tube; (125) pelta; (126) antennal segments III and VII. 127–129, *H. speciosissimus* ♀: (127) head; (128) tube; (129) antennal segment VII.



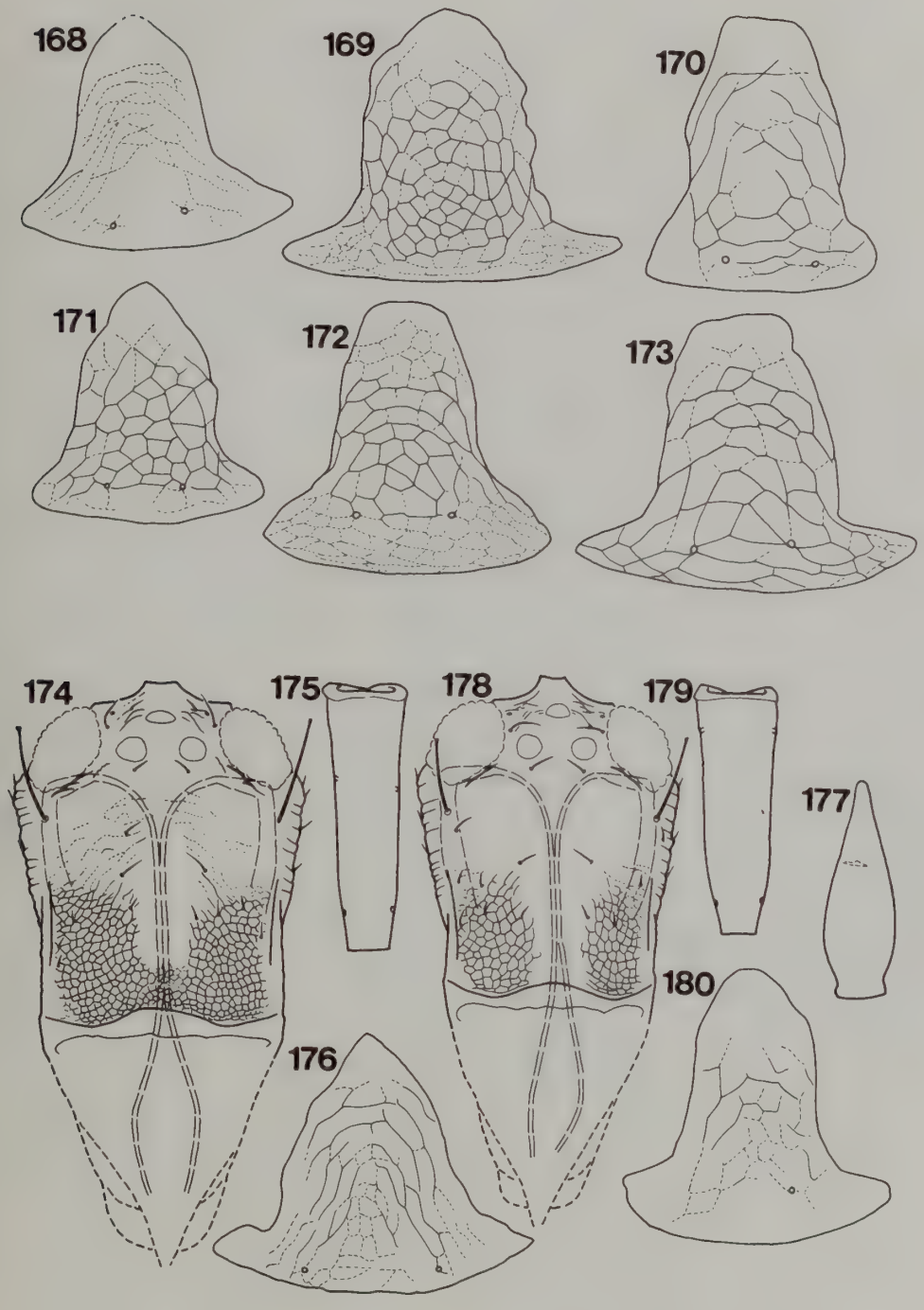
Figs 130–143 *Holothrips* species. 130–132, *H. pictus* ♀: (130) head; (131) tube; (132) pelta. 133–135, *H. sawadai* ♀: (133) head; (134) tube; (135) pelta. 136, *H. andamanensis* ♀, tube. 137–140, *H. quadrisetis* ♀: (137) head; (138) tube; (139) pelta; (140) antennal segment VII. 141–143, *H. nepalensis* ♀: (141) head; (142) tube; (143) pelta.



Figs 144–155 *Holothrips* species. 144, 145, *H. soror* ♀: (144) head; (145) tube. 146, 147, *H. schaubergeri* ♀: (146) head; (147) tube. 148–150, *H. flavitubus* ♀: (148) head; (149) tube; (150) antennal segment VII. 151–153, *H. peltatus* ♀: (151) head; (152) tube; (153) antennal segment VII. 154, 155, *H. subtilis* ♀: (154) head; (155) tube.



Figs 156–167 *Holothrips* species. 156, 157, *H. flavicornis* ♀: (156) head; (157) tube. 158, 159, *H. ananthakrishnani* ♀: (158) head; (159) tube. 160, 161, *H. porifer* ♀: (160) head; (161) tube. 162, 163, *H. cupreus* ♀: (162) head; (163) tube. 164, 165, *H. castanicolor* ♀: (164) head; (165) tube. 166, 167, *H. breviceps* ♀: (166) head; (167) tube.



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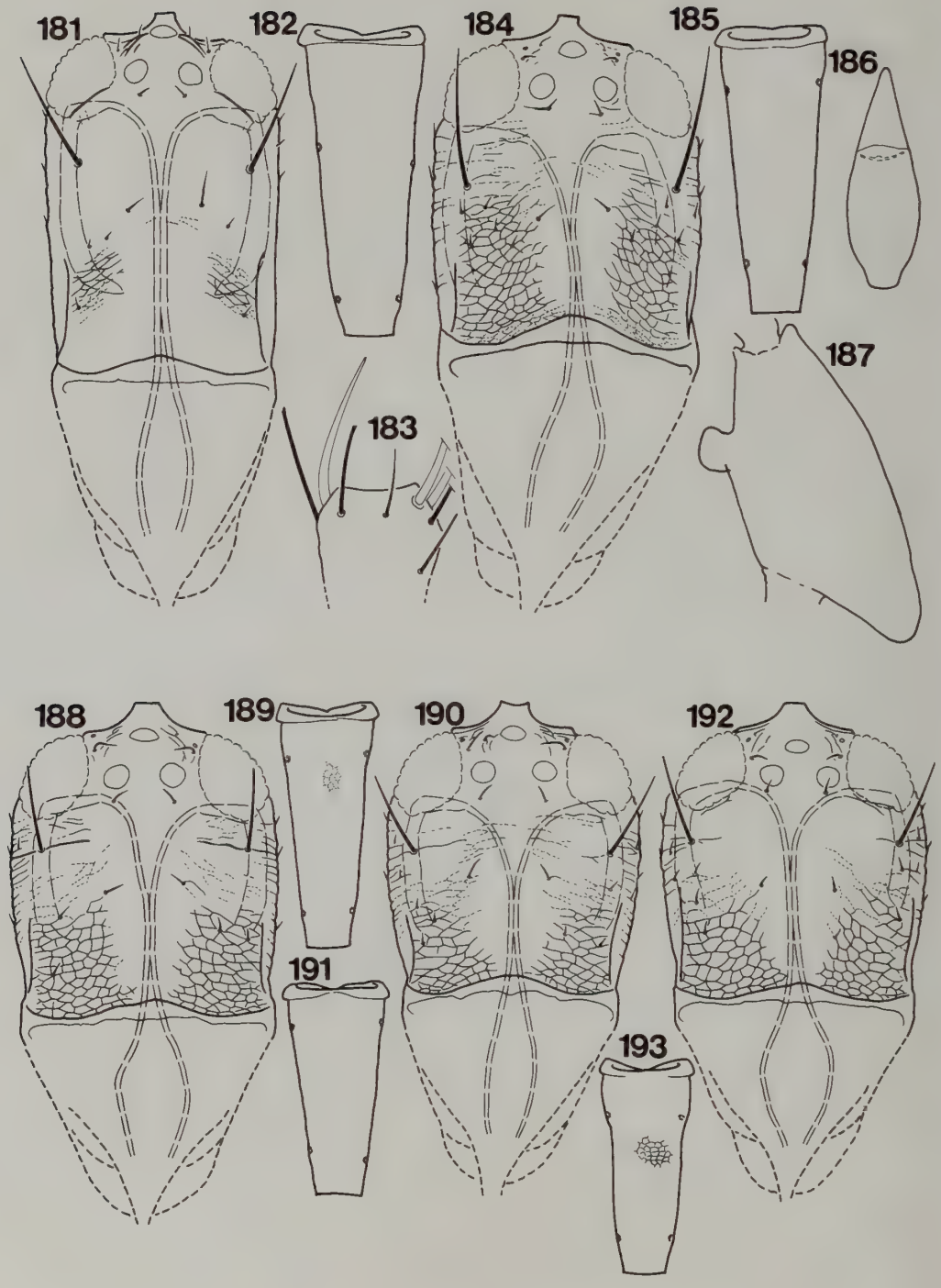

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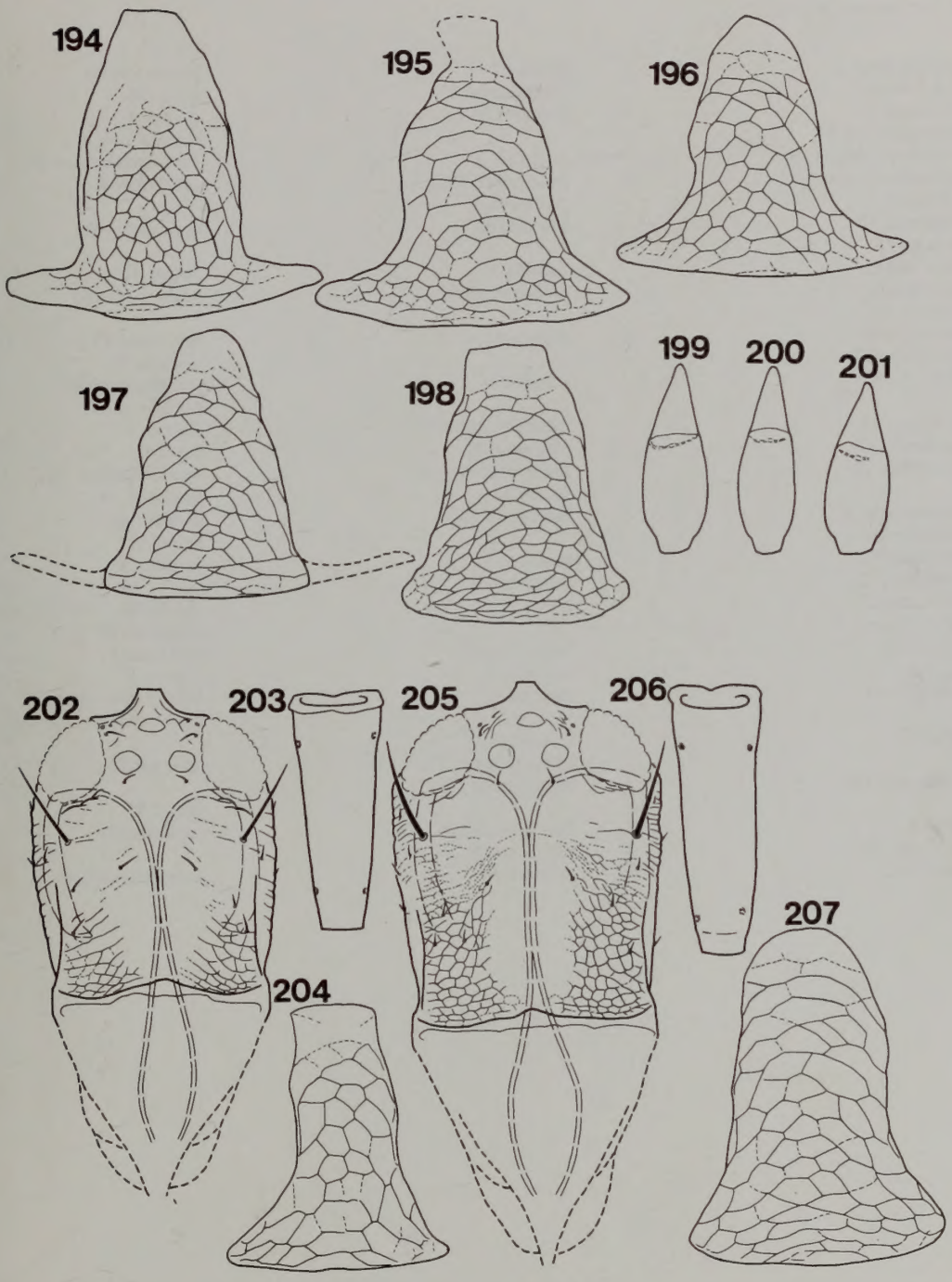

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